SOILS SOUTHWEST, INC.
SOILS, MATERIALS AND ENVIRONMENTAL ENGINEERING CONSULTANTS

897 VIA LATA, SUITE N • COLTON, CA 92324 • (909) 370-0474 • (909) 370-0481 • FAX (909) 370-3156

Reports of Geotechnical Investigations &
Soils Infiltration Testing for WQMP-BMP Design
Proposed Commercial/ Retail Development
SEC Cedar Avenue & Slover Avenue
Bloomington, California
APNs 0257-211-01-02 & 0257-221-01

Project No. 21005-F/BMP

March 19, 2021

Prepared for:

Mr. Scott Beard
c/o Gerald W. Beard Reality, Inc.
285 W. Rialto Avenue
Rialto, CA 92376

soilssouthwest@aol.com
Established 1984

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Subject: Reports of Soils and Foundation Evaluations, &
Soils Infiltration Testing for WQMP-BMP Design
Proposed Commercial/ Retail Development
SEC Cedar Avenue & Slover Avenue
Bloomington area of San Bernardino County, California
APNs 0257-211-01-02 & 0257-221-01

Reference: Preliminary Site plan prepared by Bonadiman & Associates

Gentlemen:

Presented herewith are the reports of (i) Soils and Foundation Evaluations and (ii) Soils Infiltration Testing for WQMP-BMP system design, prepared for the site of the proposed commercial/retail development consisting of a gas station, retail, carwash, and restaurants to be constructed on the vacant parcels located near the southeast intersection of Cedar Avenue and Slover Avenue, Bloomington area of San Bernardino County, California. In absence of development details, the findings, opinions, and recommendations included should be considered "preliminary", subject to revision following detailed grading plans review.

Based on the geotechnical investigations completed, it is our opinion that in general, the site soils primarily consist of upper 4 to 5 feet of loose and compressible silty fine sands, overlying deposits of medium dense to dense, fine to medium coarse gravely sands with minor rocks to the maximum 31 feet depth explored. No shallow depth bedrock or ground water was encountered.

Based on review of the available public documents it is understood that the site is not situated within an AP Special Studies Zone, and potential for seismically induced soils liquefaction susceptibility should be considered "remote".

With the presence of the low-density compressible soils described it is our opinion that the near surface soils should be considered unsuitable for directly supporting structural loadings without excessive settlements to foundations and concrete slab-on-grades. For adequate structural support, it is our opinion that the near surface soils should be reworked in form of sub-excavations and their replacement as engineered fills compacted to higher density as described herein. Foundation and structural design should considerer the geotechnical and the seismic design parameters as per the 2019 CBC as described. Chemical testing indicates the site soils may be "severely corrosive" to buried metals with Resistivity of 490 ohms/cm.

We offer no other warranty, express or implied.

Respectfully submitted,
Soils Southwest, Inc.

Moloy Gupta, RCE 31708

REGISTERED PROFESSIONAL ENGINEER
MOLOY K. GUPTA
No 31708
Exp. 12-31-22
CIVIL
STATE OF CALIFORNIA

John Flippin
Project Coordinator

Dist/1-addresse9email: scottbeard@gwbri.com; cc: ed@bonadiman.com

1.0 Introduction

Presented herewith are the Reports of (i) Soils and Foundation Evaluations and (ii) Soils Infiltration Testing for WQMP-BMP system design for the site of the proposed commercial/retail development consisting of a gas station, carwash, restaurants, and others to be constructed on the vacant parcels located near the southeast intersection of Cedar Avenue and Slover Avenue, Bloomington area of San Bernardino County, California. The recommendations included should be considered as "preliminary", subject to revision following development details and grading plan review.

The purpose of this evaluation is to determine the nature and engineering properties of the near grade and subsurface soils, and to provide geotechnical recommendations for site preparations and grading, foundation design, slab-on-grade, paving, parking, utility trenches excavations and backfills, and inspections and testing during construction.

The recommendations contained reflect our best estimate of the soils conditions as encountered. It is not to be considered as a warranty of the soils for other areas or for the depths beyond the exploratory depths described.

The recommendations supplied should be considered valid and applicable provided the following conditions are fulfilled:

i. Detailed grading and foundation details review,
ii. Pre-grade meeting with contractor, public agency, project civil and soils engineers,
iii. Excavated bottom verifications prior to engineered backfill placement for structural support,
iv. Observations and testing during site preparations and structural fill soils placement,
v. Verification of excavated footing trenches prior to steel and concrete placement,
vi. Plumbing trenches backfill placement observations and testing,
vii. On and off-site utility trench backfill placement observations and testing, and
viii. Consultations as required during construction, or upon request.

1.1 Site Descriptions

The near-level narrow and long subject parcels of unknown dimensions collectively consist of 3.14-acres are currently vacant and undeveloped. In general, the site is bounded by Slover Avenue on the north, by an open drainage channel and mobile home residential tract development on the south, by Dream Street and open drainage channel on the east, and by Cedar Avenue on the west. The overall vertical relief within the parcels is unknown, however sheet flow from incidental water appears to flow towards the south and to the southwest. Except for scattered debris and mature trees along the north and along the west perimeter, no other significant features are noted.

1.2 Proposed Development

No grading or development details are prepared and none such is available for review. However, based on the preliminary project descriptions supplied, it is understood that the subject development will primarily include a gas station/convenience store with attached carwash and restaurants of conventional wood frame and stucco construction with load bearing spread footings and concrete slabs-on-grade. Supplemental construction is anticipated to include paving/parking, driveways, landscaping and installation of underground WQMP-BMP detention basin or chambers.

It is our opinion that moderate preparations and grading should be anticipated for the development planned. For preliminary design, 40 kips and 4 klf are assumed for isolated pier and continuous wall foundations, respectively.

2.0 Scope of Services

Being beyond scope of services, no Phase I Environmental Site Assessments are included. Report on such will be supplied on request. Geotechnical evaluations included subsurface explorations, soil sampling, necessary laboratory testing, engineering analyses and the preparation of this report.

In general, scope of services included the following:

o Test Explorations

Scope of Work included eight (8) geotechnical exploratory test borings (B-1 to B-8), along with additional five (5) test explorations (P-1 to P-5) for soils infiltration testing for WQMP-BMP system design. Test explorations were made using a hollow-stem auger drilling rig supplied and operated by Calpac Drilling advanced to maximum depth of 31 feet below the current grade surface. Prior to test explorations, an underground utility clearance was established with Underground Service Alert (USA) of Southern California to avoid possible subsurface life-line obstruction and rupture. The approximate test boring locations are shown on the attached Plate 1. Following necessary soil sampling and in-situ testing, the exploratory test borings were backfilled with local soils using minimum compaction effort.

The soils encountered were continuously logged, bulk and undisturbed samples were procured. The collected samples were subsequently transferred to our laboratory for necessary testing. Description of the soils encountered is shown on the attached Log of Boring in Appendix A.

o Laboratory Testing

Representative bulk and undisturbed soils samples were tested in laboratory to aid in the soils classification and to evaluate relevant engineering properties pertaining to the project requirements. The laboratory testing, among others, included the following:

- In-situ moisture contents and dry density (ASTM Standard D2216),
- Soil Consolidation potential (D2835),
- Soil Gradation analysis (ASTM Standard D422),
- Maximum Dry Density and Optimum Moisture content (ASTM Standard D1557),
- Soils Shear strengths (ASTM Standard D3080),
- San Equivalent (ASTM Standard D2419),
- Expansion Index, EI, (ASTM Standard D4829), and
- Chemical analyses for potential soil corrosivity evaluations.

Description of the test results and test procedures used are provided in Appendix B of this report.

o Report Preparations

Based on the field investigations and laboratory testing engineering analyses and evaluations are made on which to base opinion and recommendations for site preparations and grading, foundation design, concrete slab-on-grade, paving and parking, utility trenches backfill, and monitoring during construction.

Supplemental evaluations included recommendations for WQMP-BMP infiltration design.

3.0 Site Conditions

3.1 Subsurface Conditions

Based on the geotechnical investigations completed, it is our opinion that in general, the site soils primarily consist of upper 4 to 5 feet of dry, loose, and compressible silty fine sands, overlying deposits of medium dense to dense, fine to medium coarse gravely sands with minor rocks to the maximum 31 feet depth explored. No shallow depth bedrock or ground water was encountered.

It is our opinion that the upper low-density compressible soils existing at their present state should be considered inadequate for directly supporting structural loadings without excessive differential settlements to load bearing footings and concrete slab-on-grade. When however, graded in form of sub-excavations of the upper soils and their replacement as engineered fills as described herein, the structural pads thus constructed should be considered adequate for structural support for the development planned,

Laboratory shear tests conducted on the upper bulk soil samples remolded to 90 percent indicate moderate shear strengths for the assumed load bearing support under increased moisture conditions. Results of the laboratory shear tests are provided in Plate B-1 of this report.

Consolidation tests conducted on the upper soils remolded to 90% indicate acceptable potential for compressibility under anticipated structural loadings. Results of the laboratory determined soils consolidation potential is shown on Plate B-2 in Appendix B. Chemical analyses (attached) indicate soil's "severely corrosivity" potential with Soils Resistivity 490 ohms/cm towards buried metals.

For load bearing structural support, it is our opinion that site preparations and grading should include sub-excavations of the near grade soils to either (i) 5 feet below the current grade surface, or (ii) to the depth as required to expose the underlying moist and dense natural soils, or (iii) to the depth as necessary to maintain a minimum 24" thick compacted fill mat blanket below foundation bottoms, whichever is greater. Necessary sub-excavation depths should be determined by soils engineer during grading.

In general, the sub-excavations described should encompass, in minimum, the proposed structural footprint areas and five (5) feet beyond. Where restricted due to existing development, the lateral extent described may be compensated by using deepened foundations.

The detailed sub-excavation requirements are described in later section of this report. It is recommended that sub-excavation depths for each structural pad should be verified and approved by soils engineer prior to new structural fill soils placement. Local soils free of organic should be considered suitable for re-use as structural fills.

3.1.1 Expansive Soils

Silty sand and gravel sandy soils encountered as described are considered non-expansive in characteristics with an Expansion Index, EI, less than 20. Supplemental Expansion Index evaluations may be warranted during and following grading completion.

3.2 Excavatibility

It is our opinion that the recommended site preparations and grading required for the project may be accomplished using conventional construction equipment. No blasting or jackhammering should be warranted.

3.3 Groundwater

During test explorations, no groundwater was encountered within the maximum 31 feet depth explored. However, fluctuations in groundwater levels can occur due to seasonal variations in the amount of rainfall, runoff, altered natural drainage paths, and other factors that were not obvious at the time the test explorations completed.

The following table describes the nearest water well and historical groundwater information of the site and its vicinity as listed by the local reporting agency:

GROUNDWATER TABLE	
Reporting Agency	Water Master Support Services-San Bernardino Valley Conservation District/Western Municipal Water District Cooperative Well Measuring Program, Fall 2018
Well Number	01S/05W-29A001S #20 Slover2
Well Monitoring Agency	West Valley Water District
Well Location: Township/Range/Section	T1S-R5W-Section 29
Well Elevation:	1082.4
Current Depth to Water (Measured in feet)	301
Current Date Water was Measured	November 1, 2018
Depth to Water (Measured in feet) (Shallowest)	253
Date Water was Measured (Shallowest)	January 2, 2001

3.4 Soils Corrosivity Analyses

For soil chemical analyses, near surface representative soil samples were procured and such were delivered with appropriate chain-of-custody to the EPA certified ARL Laboratory of Ontario, California for determinations of pH, sulfate, chloride, and resistivity. The results of the laboratory testing completed are attached.

Laboratory soil chemical analyses indicate soil's Resistivity of 490 ohms/cm with soils "severely corrosive" potential to buried metals. It is recommended that supplemental soil chemical analyses should be performed following mass grading completion for soils Resistivity determinations.

Corrosivity Category:

pH: Soils are considered corrosive when pH gets down to around 4.0. Since the representative sample analyzed exhibit test result of 7.10 units, it is our opinion that sample analyzed should be considered "neutral" and non-corrosive (NC), requiring no mitigation measures.

Chloride: Large concentrations of chloride will adversely affect ferrous material, such as iron and steel when in contact with soils. Soils are considered corrosive and deleterious to ferrous materials when chloride concentration *exceeds* 10,000 ppm (10,000 mg/kg) thereby requiring mitigation. With the laboratory determined Chloride concentration of 16 mg/kg, it is our opinion that the site soils should be considered "neutral" and non-corrosive (NC) requiring no mitigation measures.

Sulfate: When soluble sulfate concentrations exceed 2000 ppm (2000 mg/kg) in soils, mitigation measures must be taken to protect concrete in contact with soils. With the laboratory determined Sulfate concentration of 1100 mg/kg, it is our opinion that the site soils should be considered "neutral" and non-corrosive (NC), requiring no mitigation measures.

Resistivity: The most common factor in determining soil corrosivity is electrical resistivity. When soil's resistivity decreases, corrosivity potentials to buried metals increases, thereby requiring mitigating measures. Resistivity severity category is described in the following section.

Test Results and Remarks

Based on above, the following presents the soils chemical test results and remarks pertaining to soil chemical concentrations:

Corrosion Category and Test Standards	Test Results	Remark
pH (EPA 9045c)	7.10 (>4.0 unit)	Non-Corrosive
Chloride (EPA 300.0)	16 mg/kg (< 10,000 mg/kg)	Non-Corrosive
Sulfate (EPA300.0)	100 mg/kg (< 2000 ppm)	Non-Corrosive
Resistivity (EPA SM 2510B)	490 ohms/cm (<10,000 ohms/cm)	"Severely corrosive" to buried metals

Comments and Corrosion Control Recommendations

pH: Since the pH is more than 4.0, the site soils are considered as "non-corrosive" to concrete, requiring no special cement type.

Sulfate: With sulfate concentration in soils being less than 2000 mg/kg, no use of special cement type should be warranted.

Chloride: Soils are considered corrosive to metals when chloride concentration exceeds 10,000 mg/kg. Since the test results indicate chloride concentration below the above threshold, no mitigation measure should be required.

Resistivity: Test results of the sample evaluated indicate "mild" corrosivity potential to buried metals. However, soil Resistivity is expected to increase due to soil mixing during mass grading.

Steel/Ferrous pipes and fittings when used underground, should be applied with a dielectric coating, such as polyurethane, coal tar, inert tape or with commercially available bonded fusion epoxy or wax tape.

Laboratory soil chemical test results with Chain- of-Custody, are attached.

4.0 Faulting and Seismicity

4.1 Faulting and Seismicity

Based on the information online data search, along with the information of the Department of Conservation, State of California, it is understood that the subject site is not situated within an A-P Special Study Zone, where a fault(s) runs through or its immediate adjacent. However, the site being within Southern California, with the current industry knowhow, the planned development should be considered feasible when graded and designed using the recommendations included, including those applicable seismic design parameters as per the current 2019 CBC as described.

4.2 Direct or Primary Seismic Hazards

Surface ground rupture associated with ground shaking represents primary or direct seismic hazards to structures. There are no known active or potentially active faults that pass through or its adjacent, and the site is not situated within an AP Special Studies Zone. According to the current CBC, the site is considered situated within Seismic Zone 4. As a result, it is likely that during life expectancy of the proposed construction, moderate to severe ground shaking may have potential for adverse effects on the structure built requiring minor to moderate repair.

4.3 Induced or Secondary Seismic Hazards

In addition to ground shaking, effects of seismic activity may include flooding, land-sliding, lateral spreading, settlement, and subsidence. Potential effects of such are discussed below.

4.3.1 Flooding

Flooding hazards include tsunamis (seismic sea waves), Seiches, and failure of manmade reservoirs, tanks, and aqueducts. In absence of bodies of water nearby, such potential is considered "remote".

4.3.2 Land Sliding

With the relatively level grades, it is our opinion that potential for seismically induced land sliding is considered "low".

4.3.3 Lateral Spreading

Structures proposed are expected to withstand predicted ground softening and/or predicted vertical and lateral ground spreading/displacements, to *an acceptable level of risk*. Seismically induced lateral spreading involves lateral movement of soils due to ground shaking.

Based on the general topography of the site and its adjacent, it is our opinion that potential for seismically induced lateral ground spreading should be considered "remote".

4.3.4 Liquefaction

Liquefaction is caused by build-up of excess hydrostatic pressures in saturated cohesionless soils due to cyclic stress generated by ground shaking. The significant factors on which liquefaction potential of a soil deposit depends, among others, soil type, relative soil density, intensity of earthquake, duration of ground shaking, and depth of ground water, among others.

Considering the presence of groundwater at a depth in excess of 50 feet below grade as described, it is our opinion that the potential susceptibility to seismically induced soils liquefaction, should be considered "remote".

4.3.5 Site Specific Seismic Effects

The site is situated at about 4.86 miles from the nearest San Jacinto;SBV Fault capable of generating an earthquake magnitude of M=7.06 and PGA of 0.549g.

4.4 Seismic Design Coordinates

The design spectrum for the site is developed based on the 2019 CBC. Site Coordinates of 34.061633°N, -117.396006°W are used to establish the seismic parameters as presented below.

4.5 Seismic Design Coefficients

Recommended values are based upon the USGS ASCE 7-Hazard Reports Parameters and the California Geologic Survey: PSHA Ground Motion Interpolator Supplemental seismic parameters are provided in Appendix C of this report. The following presents the seismic design parameters as based on the available publications as currently published by the California Geological Survey and 2019 CBC. Supplemental seismic parameters are provided in Appendix C of this report.

In design, vertical accelerations may be assumed to about 1/3 to 2/3 of the estimated horizontal ground acceleration (PGA) as described in the following sections.

TABLE 4.5A.1 Seismic Design Parameters

CBC Chapter 16	2019 ASCE 7-16 Standard Seismic Design Parameters	Recommended Values
1613A.5.2	Site Class	D
1613.5.1	The mapped spectral accelerations at short period	S_s
1613.5.1	The mapped spectral accelerations at 1.0-second period	S_1
1613A5.3(1)	Seismic Coefficient, S_s	1.580g
1613A5.3(2)	Seismic Coefficient, S_1	0.614 g
1613A5.3(1)	Site Class D / Seismic Coefficient, F_a	1.000 g
1613A5.3(2)	Site Class D / Seismic Coefficient, F_v	N/A g
16A-37 Equation	Spectral Response Accelerations, $S_{Ms} = F_a S_s$	1. 580g
16A-38 Equation	Spectral Response Accelerations, $S_{M1} = F_v S_1$	N/A g
16A-39 Equation	Design Spectral Response Accelerations, $S_{Ds} = 2/3 \times S_{Ms}$	1.053 g
16A-40 Equation	Design Spectral Response Accelerations, $S_{D1} = 2/3 \times S_{M1}$	N/A g

TABLE 4.5A.2 Seismic Source Type

Based on California Geological Survey (CGS)-Probabilistic Seismic Hazard Assessment Peak Horizontal Ground Acceleration (PGA) having a 10 percent probability of exceedance in a 50- year period is as described below:

Seismic Source Type / Appendix C	
Nearest Maximum Fault Magnitude	M>\=7.06
Peak Horizontal Ground Acceleration (PGA)	0.549g

Structural design should be intended to resist total structural collapse due to the PGA as described.

Being situated within Southern California, it is our opinion that, during lifetime use of the structures built, some structural damage may occur requiring minor to major repair.

5.0 Evaluations and Recommendations

5.1 General Evaluations

The conclusions contained herein are based on surface and subsurface explorations as conducted at the test locations as described. Although no significant variations in soil conditions are anticipated, in the event subgrades exposed during construction are found different from those as described in this report, it will be the subcontractor's responsibility to notify Soils Southwest for revised and updated recommendations.

While caving was not encountered, it is possible that a trench, exploratory boring, or excavation may react in an entirely different manner. All shoring and bracing, if required, shall be in accordance with the current requirements of the State of California Division of Industrial Safety and other public agencies having jurisdiction.

Based on field explorations, laboratory testing and subsequent engineering analysis, the following general conclusions and recommendations are presented for the site under study:

(i) Moderate site clearance should be expected, including, but not be limited to, roots, stumps, buried irrigation systems, surface debris, and others.

(ii) From geotechnical viewpoint, the site is considered grossly stable for the proposed development.

(iii) Because of the near surface compressible soils existing as described, conventional grading should be in form of sub-excavations, scarification and moisturization, followed by their replacement as engineered fills compacted to higher density. In event new fill soils are required over the grades existing, such should be placed following subgrade preparations as described. No footings and/or new fills should be placed directly bearing on the compressible surface soils currently existing.

(iv) The sub-excavation depths described should be considered as 'minimum'. During grading localized deeper sub-excavations may be required following removal buried debris, irrigation pipes etc. It will be the responsibility of the grading contractor to inform soils engineer the presence of such when exposed.

(v) In order to minimize potential excessive differential settlements, it is recommended that structural footings should be established exclusively into engineered fills of local sandy soils or its equivalent or better, compacted to minimum 90% of the soils Maximum Dry Density at near Optimum Moisture conditions. Construction of footings and slabs straddling over cut/fill transition should be avoided.

(vi) Structural design considerations should also include probability for "moderate to high" peak ground acceleration from relatively active nearby earthquake faults. The effects of ground shaking, however, can be minimized by implementation of the seismic design requirements and the procedures as outlined in the current CBC, and as described earlier in this report.

(vii) Provisions should be maintained during construction to divert incidental rainfall away from the structural pads constructed.

(viii) It is our opinion that, if site preparations and grading are performed as per the generally accepted construction practices, the proposed development will not adversely affect the stability of the site, or the properties adjacent.

5.1.1 Recommendations for Site Preparations

In absence of grading plan review, the planned structural pad grades are assumed at/or near the existing street grades. For adequate structural support, it is our opinion that moderate site preparations and grading should be included in form of sub-excavations of the near grade dry and compressible soils and their replacement as engineered fills compacted to minimum 90%.

In general, site preparations and grading should include sub-excavations of the near surface soils to about (i) 5 feet below the current grade surface, or (ii) to the depth as required to expose the underlying moist and dense natural soils, or (iii) to the depth as required to maintain a 24" thick compacted fill mat blanket below foundation bottoms, whichever is greater. Unless otherwise required by the local agency, the site preparations and grading described should encompass, in minimum, the individual structural foot-print areas and minimum 5 feet beyond. No cut and fill transitional conditions should be allowed.

Within low-lying areas, fill soils required should be placed following sufficient subexcavations to expose the underlying dense subgrades as approved by the project soils engineer. During grading, the engineered fills placed should be compacted to near Optimum Moisture and with minimum 90% compaction of soil's Maximum Dry Density as determined by the ASTM D1557 test method.

The sub-excavation depths described should be considered as "preliminary". Localized additional sub-excavations may be required within areas underlain by undocumented old fills, buried utilities and abandoned sewer and/or buried septic systems. It is recommended that the excavated subgrades should be verified and approved by soils engineer prior to structural fill soil placement. Supplemental recommendations may be warranted following detailed development plans review.

General Earthwork recommendations are enclosed in Section 5 of this report.

5.2 Structural Fills

5.2.1 Structural Fill Material

Local soils free of debris, organic, roots, debris, and rocks larger than 6-inch in diameter may be considered suitable for re-use as structural backfill. Although no significant variations in soil conditions are anticipated, once exposed actual soils conditions may vary. In the event subgrades exposed during construction are found different from those as described in this report, it will be the subcontractor's responsibility to notify Soils Southwest about such variations for revised/updated recommendations. During grading, partially cemented silty sands in lumps when exposed should be thoroughly broken to small pieces prior to their incorporation as structural fills.

Structural backfills placed should be compacted to minimum 90% of the soil Maximum Dry Density as determined by the ASTM D1557 test method. Import soils, if required, should be gravelly sandy non-expansive in nature similar to the local soils as described or its better as approved by soils engineer. In general, fill soils for structural support should meet the following criteria:

Liquid Limit	<35
Plasticity Index	<15
Expansion Index	<20

5.2.2 Structural Fill Soils Placement

Structural fills shall be placed in 6- to 8-inch-thick loose lifts with near Optimum Moisture conditions. Each lift should be compacted to minimum 90 percent as described. No fill shall be placed, spread, or compacted in absence of soils engineer or his s representative on site.

For structural support within low-lying areas requiring fill soils placement to proposed grade surface, such placement should be made following subexcavations of the existing grade to sufficient depth so as to expose the underlying dense natural subgrade as approved by soils engineer.

5.3 Structural Foundations

The proposed structures may be supported by continuous wall and/or isolated spread footings founded exclusively into engineered fills of local soils or its similar imported fills approved by soils engineer compacted to minimum 90%.

Under static loading conditions, with a Factor of Safety of 3.0, load bearing foundations may be designed based on an allowable soil vertical bearing capacity of 2500 psf. Use of conventional spread footings are suggested sized to minimum 15" wide, embedded to minimum 18" below the lowest adjacent final grade. Actual foundation dimensions, however, should be determined by the project structural engineer based on anticipated structural loading, the soil vertical bearing capacity described, and on the soil's active pressures, lateral passive resistance and the described PGA, among others. Structural design should conform to the current CBC Seismic Design requirements as described earlier.

If normal code requirements are applied, the above capacities may further be increased by an additional 1/3 for short duration of loading which includes the effect of wind and seismic forces. Supplemental 500 psf increment in foundation bearing capacity may be considered for each one-foot increment in footing embedment up to a total not exceeding 3000 psf.

From geotechnical viewpoint, footing reinforcements consisting of 2-#4 rebar placed near the top and 2-#4 near bottom of continuous footings are suggested. Additional reinforcements if specified by project structural engineer, should be incorporated in construction.

The settlements of properly designed and constructed foundations supported exclusively into engineered fills of site soils or its equivalent or better and carrying the maximum anticipated structural loadings of 40 kips and 4 klf for isolated pier and continuous wall foundations as described earlier are expected to be within tolerable limits. Under static loading conditions, over a span of 40 ft, estimated total and differential settlements are about 1 and 1/2-inch, respectively.

Should the project structural engineer determine that more stringent design criteria are required, those criteria should supersede the design parameters supplied herein.

5.4 Concrete Slab-on-Grade for Conventional Use

The subgrades compacted to minimum 90% prepared to receive footings should be considered adequate for concrete slab-on-grade placement for the convenience store and restaurants proposed. Use of 4"- thick (net) concrete slab-on-grade may be considered, reinforced as recommended by structural engineer, underlain by 2-inch of compacted clean sand, followed by 10-mil thick commercially available vapor barrier, such as Stego-Wrap or its equivalent, or better, overlying additional 2-inch of clean sand. The installations of vapor barrier should be as per manufacturer's specifications. The gravelly sands described should have a Sand Equivalent, SE of 30 or greater.

5.4.1 Concrete Curing and Crack Control

The recommendations presented in this report are intended to reduce the potential for cracking of concrete slabs-on-grade due to concrete curing or settlement. However, even when the following recommendations have been implemented; foundations, stucco walls and concrete slabs-on-grade may display some minor cracking due to minor soil movement and/or concrete shrinkage.

To reduce and/or control concrete shrinkage, curling or cracking, concrete slabs shall be "cured" by using water prior to structural load placement. In general, it is recommended that construction and expansion joints associated with concrete driveways should be at intervals not exceeding 24 to 30 times the slab thickness. Actual intervals should be as required by the project structural engineer. Shorter distance between joint spacings would provide greater crack control. Joints at curves and angle points are suggested, as recommended by structural engineer.

The occurrence of concrete cracking may also be reduced and/or controlled by limiting concrete and by proper concrete placement, curing and by using crack control joints at reasonable intervals, in particular, where re-entrant slab corners occur.

5.5 Resistance to Lateral Loads

Resistance to lateral loads can be restrained by friction acting at the base of foundation and by passive earth pressure. A coefficient of friction of 0.30 may be assumed with normal dead load forces for footing established on compacted fills.

An allowable passive lateral earth resistance of 230 pounds per square foot per foot of depth may be assumed for the sides of foundations poured against compacted fills of local soils or its similar. The maximum lateral passive earth pressure is recommended not to exceed 2300 pounds.

For design, lateral pressures from local soils when used as level backfill may be estimated from the following equivalent fluid density:

Active:	35 pcf
At Rest:	80 pcf

The above values may be increased by 1/3 when designing for short duration wind or seismic forces. The above values are based on footings placed on compacted engineered fills. In the case where footing sides are formed, all backfill placed against the footings should be compacted to at least 90 percent of maximum dry density.

5.6 Shrinkage and Subsidence

Based on the results of field observations and laboratory testing, it is our opinion that the upper soils when graded may be subjected to a volume change. Assuming 90% relative compaction for structural fills as described, and assuming an over-excavation and re-compaction of about 5 feet, such volume change due to shrinkage may be on the order of 10 to 15 percent. Further volume change may be expected following removal of buried utilities, roots and surface vegetations and others.

Supplemental shrinkage is expected during preparation of the underlying subgrades prior to compacted fill soils placement. For estimation purposed, site subsoils subsidence may be approximated to about 2.5-inch when conventional construction equipment is used. Lesser shrinkage and subsidence is expected for the soil existing at 5 feet and below.

5.7 Construction Considerations

5.7.1 Unsupported Excavation

Temporary construction excavation up to a depth of 5 feet may be made without any lateral support. It is recommended that no surcharge loads such as construction equipment, be allowed within a line drawn upward at 45 degree from the toe of temporary excavations. Use of sloping for deep excavation may be considered where plan excavation dimensions are not constrained by any existing structure.

5.7.2 Supported Excavations

If vertical excavations exceeding 5 feet in depths become warranted, such should be achieved using shoring to support side walls.

5.8 Soil Caving

Considering the presence of upper loose silty sandy local soils as described, minor caving may be expected during deep excavations. Temporary excavations in excess of 5 feet should be made at a slope ratio of 2 to 1 (h:v) or flatter, or as per the construction guidelines as provided by Cal-Osha.

5.9 Structural Pavement Thickness

Flexible Asphalt Paving: Based on laboratory determined soil Sand Equivalent, SE, and on laboratory determined soil R-value of 75, the following flexible pavement sections are provided for preliminary estimation purposes.

Service Area	Traffic Index, TI	Pavement Type	Paving Thickness (inch)
On-site paving/parking for commercial/conventional passenger cars	6.5	a.c. over CL. II base	4 over 4

Within paving areas, subgrade soils should be scarified to 12-inch, moisture conditioned to near optimum, and recompacted to at least 95 percent relative to soil's maximum Dry Density as determined by the method ASTM D1557 test procedures. The asphalt used and the Class II base recommended, should also be required to be compacted to minimum 95%, unless otherwise specified by the local governing agency having jurisdiction.

The pavement evaluations are based on estimated Traffic Index (TI) as shown and on the soil R-value as described. It is recommended that following mass grading completion, representative site soils should be laboratory tested to determined actual soil R-value, based on which and on the TI as provided by the local public agency designed paving thickness should be determined for actual implementation for the project described.

Concrete Driveways (if used)

For heavy loading truck/vehicular traffic parking and driveways, subgrades to receive concrete should be subexcavated to minimum 18", followed by the excavated soils replacement compacted to at least 95%.

Concrete paving and driveways should be at last 6" (net) thick, reinforced with #5 rebar at 18" o/c, placed directly over the prepared subgrades compacted tom the minimum described. Actual paving thickness and reinforcing requirements, however, should be supplied by the project structural engineer based on soil Subgrade Reaction, k_s, of 350 kcf as described earlier.

Use of low-slump concrete is recommended. In addition, it is recommended that utility trenches underlying concrete slabs and driveways should be thoroughly backfilled with gravelly sandy soils mechanically compacted to the recommended minimum percentage described. To minimize potential for concrete "warping", use of excess water in concrete should be restricted.

5.10 Underground Fuel Storage Tank for Gas Station

Considering the presence of the relatively sandy soils as encountered it is our opinion that fuel storage tanks may be installed directly bearing on the soils existing at depth 5 feet and below. With the absence of shallow depth ground water, it is our opinion that the storage tanks installed should not require any anchoring.

5.11 Utility Trenches Backfill

Utility trenches backfill within the structural pad should be placed in accordance with the following recommendations:

- Trench backfill should be placed in thin lifts compacted to 90 percent or better of the laboratory determined maximum dry density for the soils used. Alternatively, clean granular sand may be used having a SE value greater than 30. Water Jetting is not recommended.
- Exterior trenches along a foundation or a toe of a slope and extending below a 1:1 imaginary line projected from the outside bottom edge of the footing or toe of the slope should be compacted to 90 percent of the Maximum Dry Density for the soils used during backfill. All trench excavations should conform to the requirements and safety as specified by the Cal-Osha.

Considering seismically susceptible ground shaking, use of commercially available flexible utility connections for life-line services are suggested. Utility knockouts in foundation walls should be oversized to accommodate differential movements. Utility trenches are a common source of water infiltration and migration.

If granular fill materials are placed beneath the building, utility trenches that penetrate beneath the building should be effectively sealed to restrict water intrusion and flow through the trenches that could migrate below the building.

5.12 Pre-construction Meeting

It is recommended that no clearing of the site or any grading operation be performed without the presence of a representative of this office. An on-site pre-grading meeting should be arranged between the soils engineer and the grading contractor prior to any construction.

5.13 Seasonal Limitations

No fill shall be placed, spread or rolled during unfavorable weather conditions. Where the work is interrupted by heavy rains, fill operations shall not be resumed until moisture conditions are considered favorable by the soils engineer.

5.14 Planters

To minimize potential differential settlement to foundations, planters requiring heavy irrigation should be restricted from using adjacent to footings. In event such becomes unavoidable, planter boxes with sealed bottoms, should be considered.

5.15 Landscape Maintenance

Only the amount of irrigation necessary to sustain plant life should be provided. Pad drainage should be directed towards streets and to other approved areas away from foundations. Slope areas should be planted with draught resistant vegetation. Over watering landscape areas could adversely affect the proposed site development during its life-time use.

5.16 Observations and Testing During Construction

Recommendations provided are based on the assumption that structural footings and slab-on-grade be established exclusively into compacted fills. Excavated footings should be inspected, verified and certified by soils engineer prior to steel and concrete placement to ensure their sufficient embedment and proper bearing as recommended. Structural backfills discussed should be placed under direct observations and testing by this facility. Excess soils generated from footing excavations should be removed from pad areas and such should not be allowed on subgrades underlying concrete slab.

5.17 Plan Review

Development/grading plan attached is used for "preliminary" purposes in preparing this report. It is suggested that, when prepared, project grading and development plans should be available for review to verify the assumptions made in preparing this report.

6.0 Earth Work/General Grading Recommendations

Site preparations and grading should involve over-excavation and replacement of local soils as structural fill compacted to 90% or better. Although no significant variations in soil conditions are anticipated, actual soils conditions may vary in the event subgrades exposed during construction are found different from those as described in this report. It will be the subcontractor's responsibility to notify Soils Southwest about sub soil variation, if any, for revised/updated recommendations.

Structural Backfill:

Local soils free of debris, large rocks and organic should be considered suitable for reuse as backfill. Loose soils, formwork and debris should be removed prior to backfilling retaining walls. On-site sand backfill should be placed and compacted in accordance with the recommended specifications provided below. Where space limitations do not allow conventional backfilling operations, special backfill materials and procedures may be required. Pea gravel or other select backfill can be used in limited space areas. Additional recommendations on such will be supplied when requested.

Site Drainage:

Adequate positive drainage should be maintained away from the structural pads constructed. A 2% desirable slope for surface drainage is recommended. Planters and landscaped areas adjacent to building should be designed as such so as to minimize water infiltration into sub-soils. Adjacent to footings, use of planter areas with closed bottoms and controlled drainage, should be considered.

Utility Trench:

Buried utility conduits should be bedded and backfilled around the conduit in accordance with the project specifications. Where conduit underlies concrete slab-on-grade and pavement, the remaining trench backfill above the pipe should be mechanically compacted.

General Grading Recommendations:

Recommended general specifications for surface preparation to receive fill and compaction for structural and utility trench backfill and others are presented below.

1. Areas to be graded, backfilled or paved, shall be grubbed, stripped and cleaned of all buried and undetected debris, structures, concrete, vegetation and other deleterious materials prior to grading.

2. Where compacted fill is to provide vertical support for foundations, all loose, soft and other incompetent soils should be removed to full depth as approved by soils engineer, or at least up to the depth as previously described in this report. The areas of such removal should extend at least 5 feet beyond the perimeter of exterior foundation limit or to the extent as approved by soils engineer during grading.

3. The fills to support foundations and slab-on-grade should be compacted to minimum 90% of the soil's Maximum Dry Density at near Optimum. In order to minimize potential differential settlements to foundations and slabs straddling over cut and fill transition, cut portions following cut, should be further over excavated and such be replaced as engineered fill compacted to at least 90% of the soil's Maximum Dry Density as described in this report.

4. Utility trenches within building pad areas and beyond should be backfilled with granular material and such should be mechanically compacted to at least 90% of the maximum density for the material used.

5. Compaction for structural fills shall be determined relative to the maximum dry density as determined by ASTM D1557 compaction methods. All in-situ field density of compacted fill shall be determined by the ASTM D1556 standard methods or by other approved procedures.

6. All new imported soils if required shall be clean granular non-expansive material or as approved by the soils engineer.

7. During grading, fill soils shall be placed as thin layers, thickness of which following compaction shall not exceed six to eight inches.

8. No rocks over six to eight inches in diameter shall be permitted to use as a grading material without prior approval of soils engineer.

9. No jetting and/or water tampering be considered for backfill compaction for utility trenches without prior approval of the soils engineer. For such backfill, hand tampering with fill layers of 8 to 12 inches in thickness, or as approved by the soils engineer is recommended.

10. Utility trenches at depth and cesspool and abandoned septic tank existing within building pad areas and beyond, should be excavated and removed, or such should be backfilled with gravel, slurry or by other material as approved by soils engineer.

11. Imported fill soils if required, should be equivalent to site soils or better. Such should be approved by the soils engineer prior to their use.

12. Grading required for pavement, side-walk or other facilities to be used by general public, should be constructed under direct observation of soils engineer or as required by the local public agencies.

13. A site meeting should be held between grading contractor and soils engineer prior to actual construction. Two days of prior notice will be required for such meeting.

7.0 WQMP-BMP Stormwater Disposal Design Water Infiltration Rate Using Porchet Method

Presented herewith are the preliminary results of soils infiltration testing performed for the planned storm water disposal design system proposed for the project site described. Considering the relatively homogenous silty sand during preliminary site explorations, no known changes are anticipated during site grading, however test results should be considered tentative given the potential for changes to site finish grade(s) or changes in soil conditions during grading.

Five (5) infiltration tests were performed at about 12 feet below the current grades as suggested by the project civil engineer or at the depth of favorably draining local gravely soils within the approximate location of the proposed underground stormwater chamber as supplied by the project engineering proposed site plan.

Tests were performed using the standardized "falling-head" test converted using the Porchet Method to infiltration rate as per the guidelines in accordance with the Table 1, Infiltration Basin Option 2 of Appendix A of the Riverside County-Low Impact Development (LID) BMP design Handbook as well as the Appendices Section VII.3.8.2, Appendix VII: Infiltration Rate Evaluation Protocol and Factor of Safety Recommendations of the San Bernardino County Technical Guidance Document for Water Quality Management Plans Handbook Approximate test locations are shown on Plate 1, attached.

The soils encountered consist in general of upper 5 feet of loose compressible fine silty sands, overlying deposits of medium dense to dense, fine to medium coarse sands with rock fragments and rocks to medium to coarse gravely sands with rock fragments and rocks to the maximum 12 feet depth explored and proposed chamber bottoms (P-1 to P-5). For the purposes of determining the presence/or lack of presence of groundwater or any impermeable soils, soils encountered below twelve (12) feet to maximum depth of soil sample explorations at thirty-one (31) feet consists, in general of fine to medium coarse to coarse gravely sands with traces of silts, rock fragments and rocks 1", test boring (B-2 and B-6).

No free groundwater was encountered. Descriptions of the soils encountered are provided in the Log of Borings P-1 to P-5 attached.

Based on the field infiltration testing completed, it is our opinion that for the infiltration system design proposed at about 12 feet below grade, the observed soils infiltration rates following Porchet Method Conversions are 6.25 inch/hr., 5.89-inch/hr., 6.07-inch/hr., 8.84-inch/hr., and 5.54 in/hr. for the test locations P-1, P-2, P-3, P-4, and P-5 respectively.

For design, it is suggested that use of an appropriate factor of safety considered to the observed rates as determined by the design engineer to account for long-term saturation, inconsistencies in subsoil conditions, potential for silting and lack of maintenance. The observed soils percolation rates are provided in Table7.4.1 in Section 7.4 of this report.

7.1 EXCAVATED TEST BORINGS

For BMP soil infiltration testing at the location as shown on the accompanying Plate 1, five (5) tests borings (P-1 to P-5) were made using an 8-inch diameter hollow-stem auger drilling rig, advanced to approximately 12 feet below the current grade as suggested the project engineer. Water used during infiltration percolation testing was supplied by using water jugs.

7.2 METHODOLOGY AND TEST PROCEDURES:

EQUIPMENT SET-UP (POST EXCAVATION) PROCEDURES

Following test boring completion, each of the test holes were fitted with perforated pvc pipes backfilled with 2-inch-thick crushed rock at the bottom to minimize potentials for scouring and caving. For testing, each test hole was initially filled using water supplied by portable water tank.

Prior to actual testing, in order to determine test intervals, as per the Section 2.3 for deep percolation testing of the referenced handbook guideline, two consecutive readings were performed to determine if six (6) or more inches of water seeped in 25 minutes. Since 6 inches or more of water seeped away in less than 25 minutes, subsequent percolation testing was performed at 10-minute time intervals for minimum one hour, or until the observed rates were consistent.

Testing included water placement at about 10 feet below existing grade surface (inlet depth or 24 inches above infiltration system bottom).

The final 10-minute recorded percolation test rates were converted into an Infiltration Rate (I_t) for inches per hour using the "Porchet Method" equation as described in the Reference 2, Riverside County Low Impact Development BMP Design Handbook as well as the Appendices Section VII.3.8.2, Appendix VII: Infiltration Rate Evaluation Protocol and Factor of Safety Recommendations San Bernardino County Technical Guidance Document for Water Quality Management Plans Handbook.

7.3 INFILTRATION TEST RESULT

Based on the soils infiltration testing completed at the test locations and at the test depth as described, the observed soil percolation rates are 6.25 inch/hr., 5.89-inch/hr., 6.07-inch/hr., 8.84-inch/hr., and 5.54 in/hr. for the test locations P-1, P-2, P-3, P-4, and P-5 respectively.

Calculations to convert the percolation test rate to infiltration test rates in accordance with Section 2.3 of the County Handbook are presented in Table I and II below. For design, it is suggested that, use of a factor of safety of 2.0 to 3.0, or an appropriate Factor of Safety as selected by the design engineer should be considered to the observed field percolation rate described.

7.3.1. Conversion Calculations & Summary:

TABLE II

For WQMP-BMP design, based on the soils infiltration testing completed and, on the calculations as described, the following infiltration rates may be considered. Actual field test data are attached.

Observed Infiltration Rate for Design

Test Date Test No. (3-8 & 9-2021)	Relative Site Location	Test Depth (ft.) Below Grade	Observed Rate (inch/hour) Porchet Method
P-1	South Restaurant A	12.0	6.25
P-2	Restaurant B	12.0	5.89
P-3	Restaurant C	12.0	6.07
P-4	Restaurant D	12.0	8.84
P-5	Gasoiline/Conve-nience Store	12.0	5.54

TABLE II
Conversion Table (Porchet Method)

Test No.	Depth Test Hole (inches)	Time Interval	Initial Depth (inch)	Final Depth (inch)	Initial Water Height (inch)	Final Water Height (inch)	Change Height/ Time	Average Head Height/Time
	D_T	ΔT (Min)	D_o (in)	D_f (in)	$H_o=D_t-D_o$	$H_f=D_t-D_f$	$\Delta H= H_f-H_o$	$H_{avg} = (H_o+H_f)/2$
P-1	141	10	117	127.75	24.0	13.25	10.75	18.625
P-2	138.5	10	114.5	121.75	24.0	16.75	7.25	20.375
P-3	136	10	112	122.5	24.0	13.50	10.50	18.750
P-4	142	10	118	132.0	24.0	10.00	14.0	17.000
P-5	134	10	110	113.0	24.0	21.00	3.0	22.500

	Infiltration Rate (It)=ΔH60r/Δt(r+2Havg)		
	A	B	C
Test No.	ΔH60r	Δt(r+2Havg)	A/B=in/hr
P-1	2580	412.5	6.25
P-2	1740	447.5	5.89
P-3	2520	415.0	6.07
P-4	3360	380.0	8.84
P-5	720	490.0	5.54

Use of safety factor should be considered to account for long-term saturation, inconsistencies in subsoil conditions, along with the potential for silting of percolating soils.

The infiltration rate described is based on the in-situ testing completed at the locations as suggested by the project civil engineer. In event the final chamber location and depth vary considerably from those as described herein, supplemental soils infiltration testing may be warranted.

It should be noted that over prolong use and lack of maintenance the detention/infiltration basins or deep chambers constructed based on the suggested design rate may experience much lower infiltration rate due to the accumulation of silts, fines, oils and others. Regular maintenance of the chambers in form of removal of debris, oil and fines are strongly recommended. A maintenance record of such is suggested for future use, if any.

Suggested Site Requirements for Stormwater BMP installation

The invert of stormwater infiltration shall be at least 10 feet above the groundwater elevation. Stormwater infiltration BMPs shall not be placed on steep slopes and shall not create the condition or potential for slopes instability.

Stormwater infiltration shall not increase the potential for static or seismic settlement of structures on or its adjacent.

Stormwater infiltration shall not place an increased surcharge on structures or foundations on or its adjacent. The pore-water pressure shall not be increased on soil retaining structures on or adjacent to the site.

The invert of stormwater infiltration shall be set back at least 15 feet, and outside a 1:1 plan drawn up from the bottom of adjacent foundations.

Stormwater infiltration shall not be located near utility lines where the introduction of stormwater could cause damage to utilities or settlement of trench backfill.

Stormwater infiltration is not allowed within 100 feet of any potable groundwater production well.

Once installed, regular maintenance of the detention basin is recommended.

8.0 Closure

The conclusions and recommendations presented are based on the findings and observations as made at the time of subsurface test explorations. The recommendations should be considered 'preliminary' since they are based on soil samples only. Supplemental investigation and engineering evaluations may be warranted following precise grading plans review.

If during construction, the subsoils exposed appear to be different from those as described in this report, this office should be notified to consider any possible need for revised/updated geotechnical recommendations.

Recommendations provided are based on the assumptions that structural footings will be established exclusively into compacted fill. No footings and/or slabs are allowed straddling over cut/fill transition interface.

Final grading and foundation plans should be reviewed by this office when they become available. Site grading must be performed under inspection by geotechnical representative of this office. Excavated footings should be inspected and approved by soils engineer prior to steel and concrete placement to ensure that foundations are founded into satisfactory soils and excavations are free of loose and disturbed materials.

A pre-grading meeting between grading contractor and soils engineer is recommended prior to construction preferably at the site, to discuss the grading procedures to be implemented and other requirements described in this report to be fulfilled.

This report has been prepared exclusively for the use of the addressee for the project referenced in the context. It shall not be transferred or be used by other parties without a written consent by Soils Southwest, Inc. We cannot be responsible for use of this report by others without inspection and testing of grading operations by our personnel.

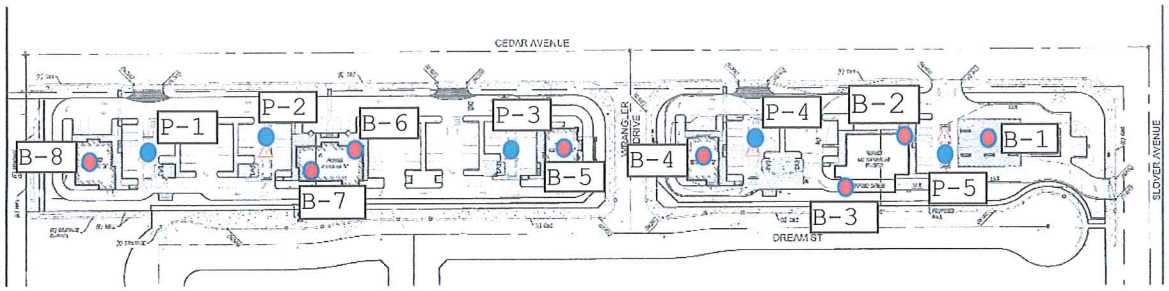
Should the project be delayed beyond one year after the date of this report; the recommendations presented shall be reviewed to consider any possible change in site conditions.

The recommendations presented are based on the assumption that the necessary geotechnical observations and testing during construction will be performed by a representative of this office. The field observations are considered a continuation of the geotechnical investigation performed.

IF ANOTHER FIRM IS RETAINED FOR GEOTECHNICAL OBSERVATIONS AND TESTING, OUR PROFESSIONAL LIABILITY AND RESPONSIBILITY SHALL BE LIMITED TO THE EXTENT THAT SOILS SOUTHWEST, INC. WOULD NOT BE THE GEOTECHNICAL ENGINEER OF RECORD. FURTHER, USE OF THE GEOTECHNICAL RECOMMENDATIONS BY OTHERS WILL RELIEVE SOILS SOUTHWEST, INC. OF ANY LIABILITY THAT MAY ARISE DURING LIFETIME USE OF THE STRUCTURES CONSTRUCTED.

PLOT PLAN AND TEST LOCATIONS
Proposed Commercial Retail Development
SEC Cedar Avenue & Slover Avenue
Bloomington, California
APNs 0257-211-01-02 & 0257-221-01

(Not to Scale)



Legend: B-1 Approximate Location of Geotechnical Test Borings
P-1 Approximate Location of soil Infiltration test

Plate A

9.0 APPENDIX A

Field Explorations

Field evaluations included site reconnaissance and eight (8) exploratory soil test borings to the maximum depth of 31 feet below the existing current grade and five (5) infiltration percolation test borings advanced to the maximum depth of 12 feet below the current grade surface using a hollow-stem auger drilling rig supplied. During site reconnaissance, the surface conditions were noted and test excavation locations were determined.

Soils encountered during explorations were logged and such were classified by visual observations in accordance with the generally accepted classification system. The field descriptions were modified, where appropriate, to reflect laboratory test results. Approximate test locations are shown on Plate 1.

Where feasible, relatively undisturbed soils were sampled using a drive sampler lined with soil sampling rings. The split barrel steel sampler was driven into the bottom of test excavations at various depths. Soil samples were retained in brass rings of 2.5 inches in diameter and 1.00 inch in height. The central portion of each sample was enclosed in a close-fitting waterproof container for shipment to our laboratory. In addition to undisturbed sample, bulk soil samples were procured as described in the logs.

Logs of test explorations are presented in the following summary sheets that include the description of the soils and/or fill materials encountered.

LOG OF TEST EXPLORATIONS

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING B-1

Project: Scott Beard		**Job No.:** 21005-F/BMP
Logged By: John F.	**Boring Diam.:** 6" HSA	**Date:** March 2,2021

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SM-ML			Gas Station Canopy Area gravels and scattered debris
8					SP-SM			SAND - light brown, silty, fine, scattered pebbles, rock fragments and rock 1"-2", loose, damp
							5	- color change to grayish light brown, gravely, slightly silty, fine to medium coarse, rock fragments, rocks 1", loose, damp
					SP			
		3.8	120.6	96.8	SP-SM			- gravely, traces of silt, fine to coarse, rock fragments, rock 1", medium dense, damp
							10	
26								- color change to yellowish light brown, slightly silty, fine to medium coarse rock fragments and rock 1/2" dense, dry - color change to yellowish gray-brown, - medium dense
							15	
53								- color change to light gray-brown, slightly silty silty, gravely, fine to medium coarse, pebbles, rock fragments, scattered rock, very dense
								- End of test boring @ 16.0 ft. - no bedrock - no groundwater
							20	
							25	
							30	

Groundwater: n/a
Approx. Depth of Bedrock: n/a
Datum: n/a
Elevation: n/a

Site Location

Proposed Commercial Development
SEC Cedar Avenue & Slover Avenue
Bloomington, California

Plate #

Standard penetration test California sampler

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING B-2

Project: Scott Beard		**Job No.:** 21005-F/BMP
Logged By: John F.	**Boring Diam.:** 6" HSA	**Date:** March 2,2021

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SM-ML			GAS STATION/CONVENIENT STORE area gravels and scattered debris
6							5	SAND - brown, silty,fine, occasional rock fragments and scattered rock, loose, damp - loose
		4.2	117.2	94.5	SM			- color change to yellowish light brown, silty, fine to medium coarse, rock fragments, rock 3/4", dense, dry
17					SP		10	- color change to grayish brown, traces of silt, gravely, fine to medium coarse, pebbles, rock fragments, occasional 1/2" to 1" rock, damp - medium dense, dry
		2.3	120.5	97.2	SM		15	- color change to yellowish light brown, silty, fine to medium coarse, rock fragments and 3/4" rock, very dry, very dense
42					SP		20	- traces of silt, fine to medium coarse, pebbles, rock fragments, rock 1", dense, dry
35							25 30	- traces of silt, fine to medium coarse, pebbles, rock fragments, rock 1", dense, dry
								- End of test boring @ 31.0 ft. - no bedrock - no groundwater

Groundwater: n/a **Approx. Depth of Bedrock:** n/a **Datum:** n/a **Elevation:** n/a	**Site Location** Proposed Commercial Development SEC Cedar Avenue & Slover Avenue Bloomington, California	**Plate #**

Standard penetration test California sampler Bulk/Grab sample

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING B-3

Project: Scott Beard | **Job No.:** 21005-F/BMP

Logged By: John F. | **Boring Diam.:** 6" HSA | **Date:** March 2,2021

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SM-ML			GAS STATION CARWASH gravels and scattere debris
		7.0	101.2	81.65	SM			SAND - brown, silty, fine, scattered pebbles very loose
							5	- color change to orangish light brown, silty, fine to medium, occasional rock 1/2"
4								- CHEMICAL ANALYSIS SAMPLE
								- color change to light brown, silty, fine, scattered pebbles and rock 1", very loose damp
		4.2	114.2	92.1	SP			
							10	- color change to yellowish light brown, traces of silt, fine to medium coarse, pebbles, rock fragments, scattered rock dense
					SP-SM			
								- slightly silty, fine to medium coarse, pebbles, rock fragments, scattered rock low to medium dense, damp
							15	
44					GP-SP			- gravely, medium to medium coarse, rock fragments, rock 1", dense, dry
								- End of test boring @ 16.0 ft. - no bedrock - no groundwater
							20	
							25	
							30	

Groundwater: n/a
Approx. Depth of Bedrock: n/a
Datum: n/a
Elevation: n/a

Site Location

Proposed Commercial Development
SEC Cedar Avenue & Slover Avenue
Bloomington, California

Plate #

Standard penetration test | California sampler | Bulk/Grab sample

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING B-4

Project: Scott Beard		**Job No.:** 21005-F/BMP
Logged By: John F.	**Boring Diam.:** 6" HSA	**Date:** March 2,2021

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SM-ML			RESTAURANT n/o Wrangler gravels
		8.9	103.9	83.8	SP-SM			SAND - brown, silty, fine, scattered rock fragments and rock, very loose, damp
							5	- color change to orangish light brown, slightly silty, fine to medium, pebbles, rock fragments
7					SP			- fine to medium, pebbles, occasional rock fragments, loose, damp
							10	
16								- color change to light brown, traces of silt, gravely, fine to coarse, occasional rock fragments, medium dense, damp
							15	
37					SP			- fine to medium coarse, pebbles, rock fragments, occasional rock, dense, dry to damp
								- End of test boring @ 16.0 ft. - no bedrock - no groundwater
							20	
							25	
							30	

Groundwater: n/a **Approx. Depth of Bedrock:** n/a **Datum:** n/a **Elevation:** n/a	**Site Location** Proposed Commercial Development SEC Cedar Avenue & Slover Avenue Bloomington, California	**Plate #**

Standard penetration test California sampler Bulk/Grab sample

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING B-5

Project: Scott Beard		**Job No.:** 21005-F/BMP
Logged By: John F.	**Boring Diam.:** 6" HSA	**Date:** March 2,2021

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SM-ML			RESTAURANT s/o Wrangler gravels and scattered debris
15							5	SAND- brown, silty, fine, scattered pebbles and rock fragments, dry to damp, loose - color change to light brown with rocks, medium dense
					SP			- color change to grayish brown, gravely, traces of silt, fine to medium coarse, rock fragments, rock, dry to damp
21					GP-SP		10	- color change to light gray brown, gravely, medium to coarse, rippible rock, medium dense, dry - traces of silt, fine to medium coarse, pebbles, rock framgnents, 1/2" rock, dry medium dense
		3.1	109.0	87.9			15	- End of test boring @ 5.0 ft. - no bedrock - no groundwaterd
							20	
							25	
							30	

Groundwater: n/a
Approx. Depth of Bedrock: n/a
Datum: n/a
Elevation: n/a

Site Location

Proposed Commercial Development
SEC Cedar Avenue & Slover Avenue
Bloomington, California

Plate #

Standard penetration test California sampler Bulk/Grab sample

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING B-6

Project: Scott Beard		**Job No.:** 21005-F/BMP
Logged By: John F.	**Boring Diam.:** 6" HSA	**Date:** March 2,2021

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SM-ML			RESTAURANT gravels and scattered debris
11							5	SAND - light brown, silty, fine, scattered pebbles and rock fragments, dry to damp - occasional rock 1", dry
		2.5	116.7	94.13	SP			- color change to light gray-brown, traces of silt, fine to medium coarse, pebbles and rock fragments, rock 1/2"
23							10	- color change to light gray-brown, traces of silt, gravely, fine to medium coarse, pebbles, rock fragments, scattered rock, dry
							15	
							20	- color change to yellowish light brown, traces of silt, fine to medium coarse, pebbles and rock fragments
29					GP-SP			- color change to gray-brown gravely, medium to coarse, dry, dense
							25	- End of test boring @ 21.0 ft. - no bedrock - no groundwater
							30	

Groundwater: n/a **Approx. Depth of Bedrock:** n/a **Datum:** n/a **Elevation:** n/a	**Site Location** Proposed Commercial Development SEC Cedar Avenue & Slover Avenue Bloomington, California	**Plate #**

Standard penetration test California sampler Bulk/Grab sample

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING B-7

Project: Scott Beard		**Job No.:** 21005-F/BMP
Logged By: John F.	**Boring Diam.:** 6" HSA	**Date:** March 2,2021

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SM-ML			RESTAURANT gravels
								SAND - light brown, silty, fine, scattered pebbles and rock fragments, dry to damp, loose
		4.7	116.4	93.87			5	- (Max Dry Density = 124 pcf @ 10 %
9					SP			- gravely, traces of silt, fine to medium coarse, pebbles, rock fragments, rock, loose, dry
							10	
							15	
33								- fine to medium coarse, pebbles, rock fragments, dry, dense
								- End of test boring @ 16.0 ft. no bedrock no groundwater
							20	
							25	
							30	

Groundwater: n/a **Approx. Depth of Bedrock:** n/a **Datum:** n/a **Elevation:** n/a	**Site Location** Proposed Commercial Development SEC Cedar Avenue & Slover Avenue Bloomington, California	**Plate #**

Standard penetration test California sampler Bulk/Grab sample

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING B-8

Project: Scott Beard		**Job No.:** 21005-F/BMP
Logged By: John F.	**Boring Diam.:** 6" HSA	**Date:** March 2,2021

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SM-ML			RESTAURANT (south end) gravels, scattered debris
								SAND - light brown, silty, fine, scattered pebbles and rock fragments, very loose, dry to damp
							5	
5								- very loose
		3.1	117.2	94.5	SP			- color change to gray, gravely, traces of silt, fine to medium coarse, pebbles rock fragments, rocks, dry
							10	
14								- fine to medium coarse, pebbles, rock fragments, scattterd rock 1/2" - 1", dry
								- End of test boring @ 11.0 ft. - no bedrock - no groundwater
							15	
							20	
							25	
							30	

Groundwater: n/a **Approx. Depth of Bedrock:** n/a **Datum:** n/a **Elevation:** n/a	**Site Location** Proposed Commercial Development SEC Cedar Avenue & Slover Avenue Bloomington, California	**Plate #**

Standard penetration test California sampler Bulk/Grab sample

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING P-1

Project: Scott Beard		**Job No.:**	21005-F/BMP
Logged By: John F.	**Boring Diam.:** 8" HSA	**Date:**	March 2,2021

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SM-ML			RESTAURANT (south end) gravels and scattered debris
								SAND- light brown to brown, silty, fine, scattered pebbles and rock fragments loose to medium dense
							5	- with scattered rock
					SP			- color change to grayish light brown, traces of silt, fine to medium coarse, pebbles, rock fragments, occasional rock, dry to damp
							10	
								- End of infiltration test boring @ 12' - no bedrock - no groundwater - 3" perforated pvc pipe installed with gravel at bottom
							15	
							20	
							25	
							30	

Groundwater: n/a
Approx. Depth of Bedrock: n/a
Datum: n/a
Elevation: n/a

Site Location

Proposed Commercial Development
SEC Cedar Avenue & Slover Avenue
Bloomington, California

Plate #

Standard penetration test California sampler Bulk/Grab sample

Soils Southwest, Inc.
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(909) 370-0474 Fax (909) 370-3156

LOG OF BORING P-2

Project: Scott Beard		**Job No.:** 21005-F/BMP
Logged By: John F.	**Boring Diam.:** 8" HSA	**Date:** March 2,2021

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SM-ML			RESTAURANT (center south) gravels and scattered debris
								SAND- light grayis brown, silty, fine, scattered pebbles and rock fragments loose to medium dense, damp
							5	- color change to light brown, damp
					SP-SM		10	- slightly silty, fine to medium, rock fragments and occasional rock, 1/2"-1" damp
					SP			- traces of silt, fine to medium coarse, rock fragments and rock.
							15	- End of test boring @ 12.0 ft. - no bedrock - no groundwater - 3" perforated pvc pipe installed with gravel at bottom
							20	
							25	
							30	

Groundwater: n/a **Approx. Depth of Bedrock:** n/a **Datum:** n/a **Elevation:** n/a	**Site Location** Proposed Commercial Development SEC Cedar Avenue & Slover Avenue Bloomington, California	**Plate #**

Standard penetration test California sampler Bulk/Grab sample

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING P-3

Project: Scott Beard		**Job No.:** 21005-F/BMP
Logged By: John F.	**Boring Diam.:** 8" HSA	**Date:** March 2,2021

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SM-ML			RESTAURANT (south of Wrangler) gravels and scattered debris
								SAND- light brown, silty, fine, scattered pebbles and rock fragments loose to medium dense, dry to damp
							5	- pebbles, rock fragments, occasional rock dry to damp
					SP			- traces of silt, fine to medium coarse, pebbls, rock fragments and occasional rock, 1/2"-1" dry to damp
							10	
					GP			GRAVEL - rocks and cobbles with little to no sand
					GP-SP			- gravely, medium to coarse, pebbles, rock fragments, rock
							15	- End of test boring @ 12.0 ft. - no bedrock - no groundwater - 3" perforated pvc pipe installed with gravel at bottom
							20	
							25	
							30	

Groundwater: n/a **Approx. Depth of Bedrock:** n/a **Datum:** n/a **Elevation:** n/a	**Site Location** Proposed Commercial Development SEC Cedar Avenue & Slover Avenue Bloomington, California	**Plate #**

Standard penetration test California sampler Bulk/Grab sample

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING P-4

Project: Scott Beard		**Job No.:** 21005-F/BMP
Logged By: John F.	**Boring Diam.:** 8" HSA	**Date:** March 2,2021

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SM-ML			RESTAURANT (north of Wrangler) gravels and scattered debris
								SAND- light brown, silty, fine, scattered pebbles and rock fragments, damp
							5	- scattered rock 1/2-1", damp
					SP-SM			- rock 1/2"-1", damp
					SP		10	- traces of silt, gravely, fine to coarse, pebbles, rock fragments, occaasional rock damp
					GP-SP			- gravely, medium to coarse, pebbles, rock fragments, rock, dry to damp
							15	- End of test boring @ 12.0 ft. - no bedrock - no groundwater - 3" perforated pvc pipe installed with gravel at bottom
							20	
							25	
							30	

Groundwater: n/a
Approx. Depth of Bedrock: n/a
Datum: n/a
Elevation: n/a

Site Location

Proposed Commercial Development
SEC Cedar Avenue & Slover Avenue
Bloomington, California

Plate #

Standard penetration test California sampler Bulk/Grab sample

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING P-5

Project: Scott Beard		**Job No.:** 21005-F/BMP
Logged By: John F.	**Boring Diam.:** 8" HSA	**Date:** March 2,2021

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SM-ML			GAS STATION (north end) gravels and scattered debris
								SAND- light brown, silty, fine, pebbles and rock fragments, rock 1", damp
							5	
					SP			- traces of silt, gravely, fine to medium coarse, pebbles, rock fragments, occasional rock 1", dry to damp
							10	
					GP-SP			- gravely, medium to coarse, rock fragments and rock, scattered cobbles
					SP			- color change to grayish-light brown, traces of silt, fine to coarse, rock fragments and rock 1/2"-1" dry
							15	- End of test boring @ 12.0 ft. - no bedrock - no groundwater - 3" perforated pvc pipe installed with gravel at bottom
							20	
							25	
							30	

Groundwater: n/a **Approx. Depth of Bedrock:** n/a **Datum:** n/a **Elevation:** n/a	**Site Location** Proposed Commercial Development SEC Cedar Avenue & Slover Avenue Bloomington, California	**Plate #**

Standard penetration test California sampler Bulk/Grab sample

KEY TO SYMBOLS

Symbol Description

Strata symbols


Poorly graded silty fine sand


Poorly graded sand with silt


Poorly graded sand


Silty sand


Poorly graded gravel and sand


Poorly graded gravel

Soil Samplers


Standard penetration test


California sampler


Bulk/Grab sample

Notes:

1. Exploratory borings were drilled on March 2,2021 using a 4-inch diameter continuous flight power auger.

2. No free water was encountered at the time of drilling or when re-checked the following day.

3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests conducted on samples recovered are reported on the logs.

WQMP-BMP Field Data Sheets

Percolation Test Data Sheet

Project:	3017 BMP	Project No:	21005 BMP	Date:	3/8/21
Test Hole No:	P-1	Tested By:	JF		
Depth of Test Hole, D_T:	141	USCS Soil Classification:			

Test Hole Dimensions (inches)			Length	Width	
Diameter (if round)=	8 inches	Sides (if rectangular)=			

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6"? (y/n)
1	11:48	12:13	25	117	136.0	19.0	y
2	12:15	12:40	25	117	135.5	18.5	y

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Other wise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Percolation Rate (min./in.)
1	12:44	12:54	10	117	130.0	13.0	
2	12:57	1:07	10	117	129.0	12.0	
3	1:14	1:24	10	117	129.0	12.0	
4	1:25	1:35	10	117	128.5	11.5	
5	1:36	1:46	10	117	128.0	11.0	
6	1:52	2:02	10	117	128.0	11.0	
7	2:06	2:16	10	117	128.0	11.0	
8	2:20	2:30	10	117	127.75	10.75	
9	2:33	2:43	10	117	127.75	10.75	
10	2:45	2:55	10	117	127.75	10.75	
11							
12							
13							
14							
15							

COMMENTS:

Percolation Test Data Sheet

Project:	Scott Bond	Project No:	21005-BMP	Date:	3-8-21
Test Hole No:	P-2	Tested By:	JF		
Depth of Test Hole, D_T:	138.5	USCS Soil Classification:			

Test Hole Dimensions (inches)			Length	Width	
Diameter (if round)=	8 inches	Sides (if rectangular)=			

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval, (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6"? (y/n)
1	1:33	1:58	25	114.5	133.75	19.25	
2	2:03	2:28	25	114.5	133.00	18.50	

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Other wise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

Trial No.	Start Time	Stop Time	At Time Interval (min.)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Percolation Rate (min./in.)
1	2:40	2:50	10	114.5	126.50	12.00	
2	2:54	3:04	10	114.5	126.25	11.75	
3	3:10	3:20	10	114.5	125.75	11.25	
4	3:23	3:33	10	114.5	125.50	11.00	
5	3:36	3:46	10	114.5	125.00	10.50	
6	3:51	4:01	10	114.5	124.75	10.25	
7	4:06	4:16	10	114.5	124.75	10.25	
8	4:20	4:30	10	114.5	124.75	10.25	
9							
10							
11							
12							
13							
14							
15							

COMMENTS:

Percolation Test Data Sheet

Project:	Scott Bates	Project No:	21005-1344	Date:	3/9/21
Test Hole No:	P-3	Tested By:	JF		
Depth of Test Hole, D_T:	136 inches	USCS Soil Classification:			

Test Hole Dimensions (inches)			Length	Width	
Diameter (if round)=	6 inches	Sides (if rectangular)=			

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6"? (y/n)
1	2:07	2:32	25	112	135	23	Y
2	2:35	3:00	25	112	133	21	Y

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Other wise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	D_0 Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Percolation Rate (min./in.)
1	3:04	3:14	10	112	124.00	12.0	
2	3:17	3:27	10	112	123.75	11.75	
3	3:31	3:41	10	112	123.50	11.50	
4	3:43	3:53	10	112	123.50	11.50	
5	3:56	4:06	10	112	122.50	10.50	
6	4:07	4:17	10	112	122.50	10.50	
7	4:19	4:29	10	112	122.50	10.50	
8							
9							
10							
11							
12							
13							
14							
15							

COMMENTS:

Percolation Test Data Sheet

Project:	Scott Bano	Project No:	21005-BAN	Date:	3/9/21
Test Hole No:	P-4	Tested By:	JF		
Depth of Test Hole, D_T:	142 mm	USCS Soil Classification:			

Test Hole Dimensions (inches)			Length	Width	
Diameter (if round)=	6 inches	Sides (if rectangular)=			

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval, (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6"? (y/n)
1	11:30	11:55	25	118	139	21	Y
2	11:59	12:24	25	116	139	21	Y

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Other wise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Percolation Rate (min./in.)
1	12:27	12:37	10	116	134	16	
2	12:39	12:49	10	118	134	16	
3	12:52	1:02	10	116	134	16	
4	1:03	1:13	10	118	133	15	
5	1:15	1:25	10	118	133	15	
6	1:26	1:36	10	118	132.5	14.5	
7	1:42	1:52	10	116	132.0	14.0	
8	1:54	2:04	10	118	132.0	14.0	
9	2:06	2:16	10	118	132.0	14.0	
10							
11							
12							
13							
14							
15							

COMMENTS:

Percolation Test Data Sheet

Project:	Scott Bower	Project No:	21005-BMP	Date:	3-7-21
Test Hole No:	P-5	Tested By:	JF		
Depth of Test Hole, D_T:	134 inches	USCS Soil Classification:			

Test Hole Dimensions (inches)			Length	Width	
Diameter (if round)=	8 inches	Sides (if rectangular)=			

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval, (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6"? (y/n)
1	11:42	12:07	25	110	130	20	
2	12:07	12:32	25	110	129	19	Y

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Other wise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	D_0 Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Percolation Rate (min./in.)
1	12:33	12:43	10	110	121.25	11.25	
2	12:46	12:56	10	110	121.00	11:00	
3	12:59	1:09	10	110	120.50	10.50	
4	1:13	1:23	10	110	120.50	10.50	
5	1:24	1:34	10	110	120.25	10.25	
6	1:35	1:45	10	110	119.75	9.75	
7	1:47	1:57	10	110	119.75	9.75	
8	1:59	2:09	10	110	119.75	9.75	
9	2:10	2:20	10	110	119.75	9.75	
10							
11							
12							
13							
14							
15							

COMMENTS:

9.0 APPENDIX B

Laboratory Test Programs

Laboratory tests were conducted on representative soils for the purpose of classification and for determinations of the physical properties and engineering characteristics. The number and selection of the types of testing for a given study are based on the geotechnical conditions of the site. A summary of the various laboratory tests performed for the project is presented below.

Moisture Content and Dry Density (D2937):

Data obtained from these tests, performed on undisturbed samples are used to aid in the classification and correlation of the soils and to provide qualitative information regarding soil strength and compressibility.

Direct Shear (D3080):

Data obtained from this test performed at increased and field moisture conditions on relatively remolded soil sample is used to evaluate soil shear strengths. Samples contained in brass sampler rings, placed directly on test apparatus are sheared at a constant strain rate of 0.002 inch per minute under saturated conditions and under varying loads appropriate to represent anticipated structural loadings. Shearing deformations are recorded to failure. Peak and/or residual shear strengths are obtained from the measured shearing load versus deflection curve. Test results, plotted on graphical form, are presented on Plate B-1 of this section.

Consolidation (D2835):

Drive-tube samples are tested at their field moisture contents and at increased moisture conditions since the soils may become saturated during lifetime use of the planned structure.

Data obtained from this test performed on relatively undisturbed and/or remolded samples, were used to evaluate the consolidation characteristics of foundation soils under anticipated foundation loadings. Preparation for this test involved trimming the sample, placing it in one-inch-high brass ring, and loading it into the test apparatus which contained porous stones to accommodate drainage during testing. Normal axial loads are applied at a load increment ratio, successive loads being generally twice the preceding.

Soil samples are usually under light normal load conditions to accommodate seating of the apparatus. Samples were tested at the field moisture conditions at a predetermined normal load. Potentially moisture sensitive soil typically demonstrated significant volume change with the introduction of free water. The results of the consolidation tests are presented in graphical forms on Plate B-2.

Potential Expansion ASTM Standard (D4829-88)

Silty sandy in nature, the site soils are considered 'very low' in expansion characteristic. Supplemental testing for soil expansion should be performed following mass grading completion.

Laboratory Test Results

Table I: In-Situ Moisture-Density (ASTM D2216)

Test Boring No.	Sample Depth, ft.	Dry Density, pcf.	Moisture Content, %
1	7.0	120.1	3.8
2	5.0	117.6	4.2
2	15.0	120.5	2.3
3	3.0	101.2	7.0
3	8.0	114.2	4.2
4	3.0	103.9	8.9
5	10.0	109.0	3.1
6	7.0	116.7	2.5
7	4.0	116.4	4.7
8	8.0	117.2	3.1

Table II: Max. Density/Optimum Moisture Content (ASTM D1557)

Sample Location, @ Depth, ft.	Max. Dry Density, pcf	Opt. Moisture (%)
B-4 @ 4-7 Sand-lt. brown, silty, fine, with pebbles, rock fragments and rock 1-2"	124	10.0

Table III: Direct Shear (ASTM D3080)

Test Boring & Sample Depth (ft)	Test Condition	Cohesion (PSF)	Friction (Degree)
B-7 @ 4-7	Remolded to 90%	360	43
B-6@ 7	Undisturbed	0.0	41

Table IV: Consolidation (ASTM D2435)

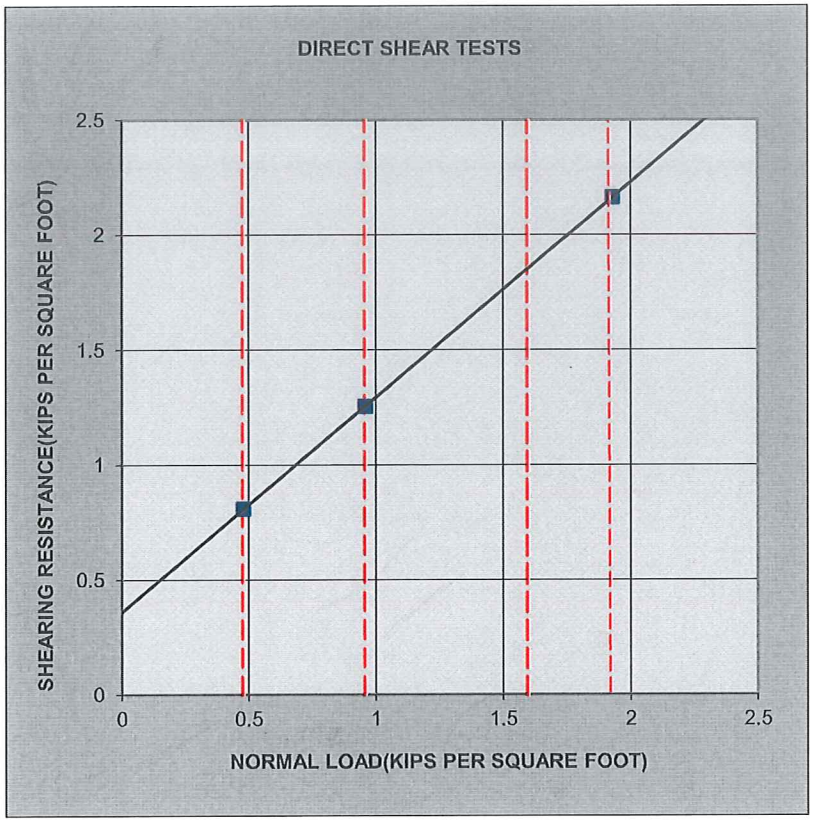
Boring B #	Depth (ft.)	Consolidation prior to saturation (%) @ 2 kips	Hydro collapse (%) @ 2 kips	Total Consolidation (%@ 8 kips) (saturated)
7 (remolded)	4-7	0.5	0.1	1.7
2 (undisturbed)	5	1.1	1.8	5.6
3 (undisturbed)	3	2.7	4.8	10.0
8 (undisturbed)	8	0.5	1.0	6.1

Table V: Sand Equivalent (ASTM D2419)

Sample Location @ depth, ft.	Sand Equivalent Average
B-2 @ 0-5	14.05

Table VI: Soils Expansion Index, EI. (ASTM D4829)

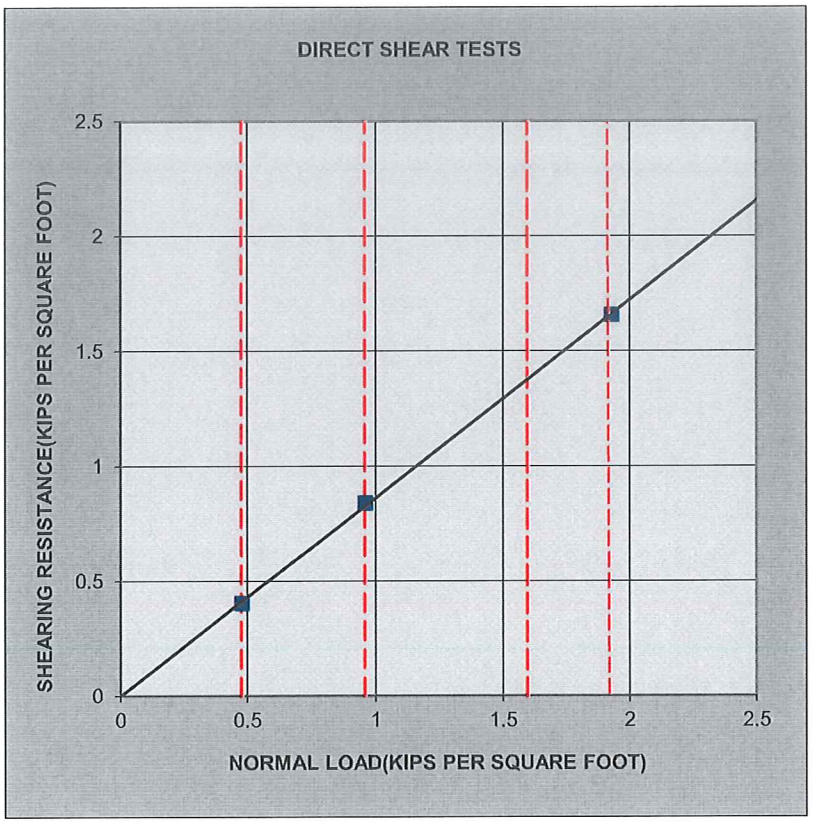
Sample Location & Soils Type	Soil Expansion Index, EI	Expansion Potential
B-7 @ 4-7' Sand-lt. brown, silty, fine, with pebbles, rock fragments and rock 1-2"	0.0	"very low"



SYMBOL	LOCATION	DEPTH (FT)	TEST CONDITION	COHESION (psf)	FRICTION (degree)
■	B-7	4 to 7	Remolded to 90%	360.16	43.05

Proposed Commercial Development SEC Cedar Avenue & Slover Avenue Bloomington, California	PROJECT NO.	21005-F
	PLATE	B-1

SOILS SOUTHWEST, INC.
Consulting Foundation Engineers

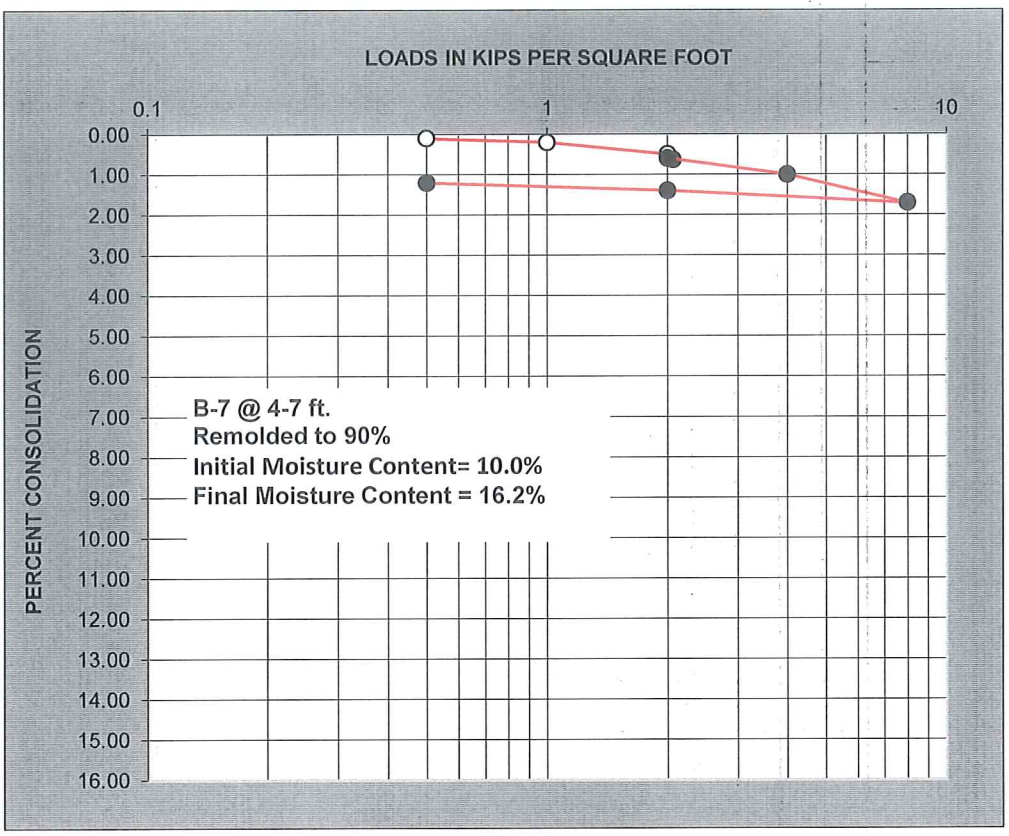


SYMBOL	LOCATION	DEPTH (FT)	TEST CONDITION	COHESION (psf)	FRICTION (degree)
■	B-6	7.0	Undisturbed	0.10	40.74

Proposed Commercial Development SEC Cedar Avenue & Slover Avenue Bloomington, California	PROJECT NO.	21005-F
	PLATE	B-1-1

SOILS SOUTHWEST, INC.
Consulting Foundation Engineers

CONSOLIDATION TESTS

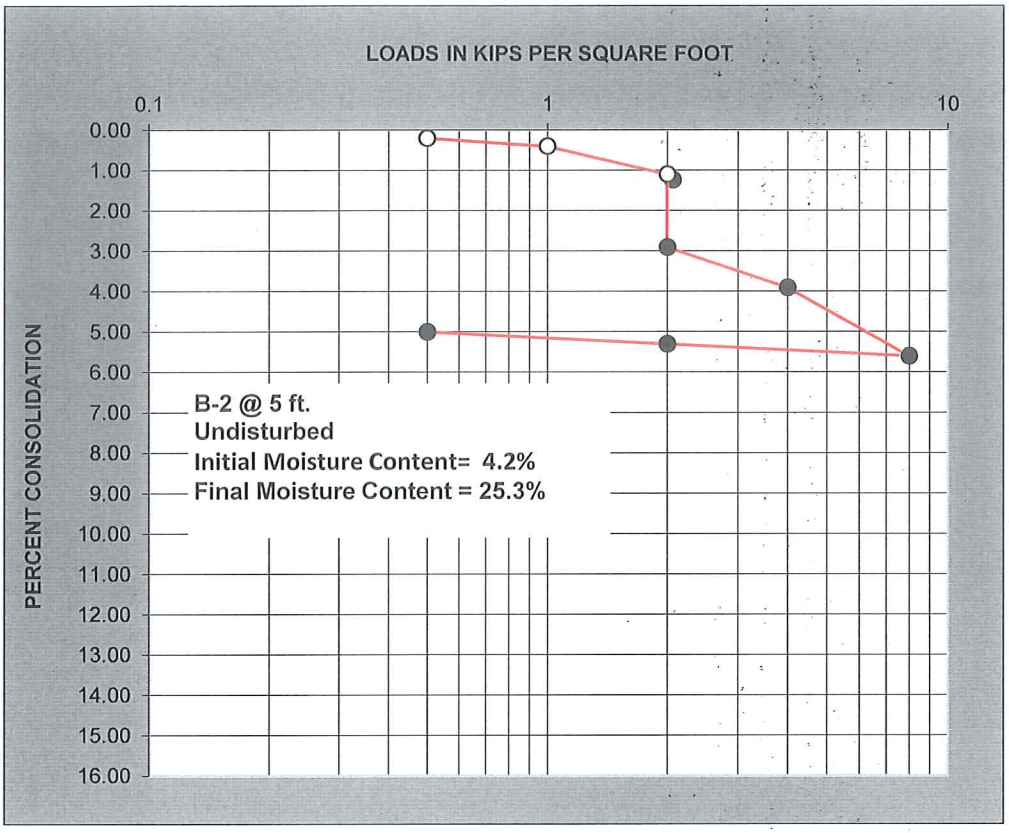


- **WATER PERMITTED TO CONTACT SAMPLE**

	PROJECT	Proposed Commercial Development SEC Cedar Avenue & Slover Avenue, Bloomington		
	PROJECT NO.	21005-F	PLATE	B-2

SOILS SOUTHWEST INC.
Consulting Foundation Engineers

CONSOLIDATION TESTS

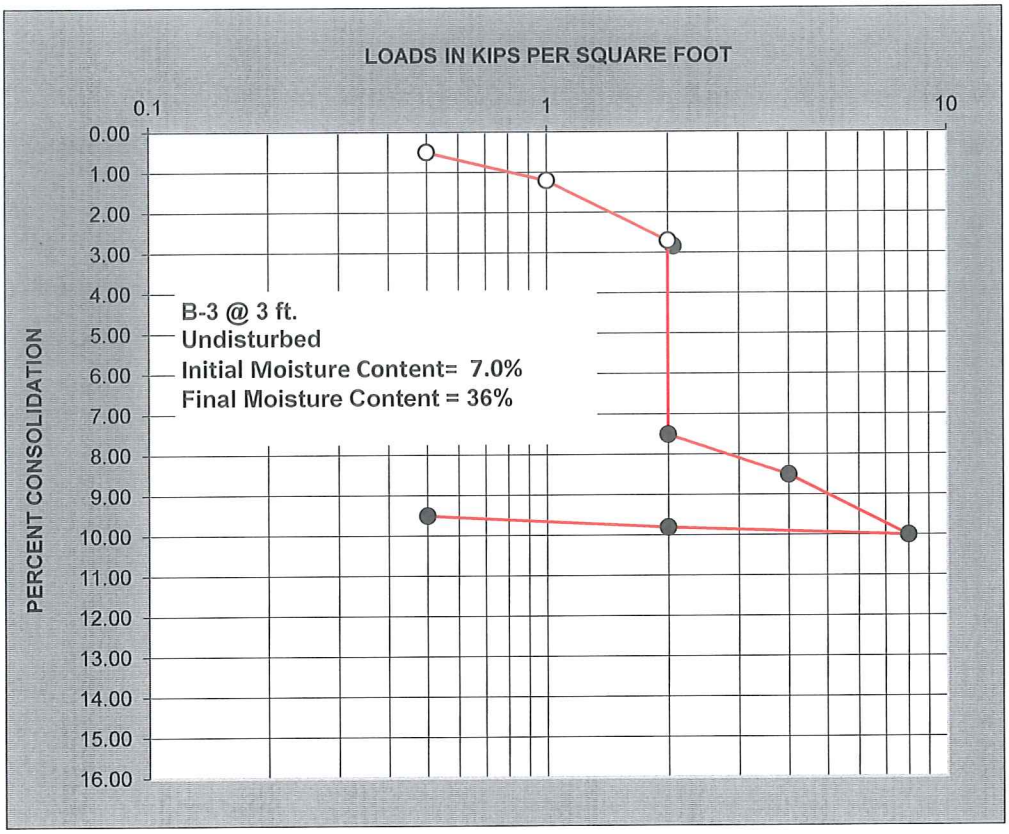


- **WATER PERMITTED TO CONTACT SAMPLE**

	PROJECT	Proposed Commercial Development SEC Cedar Avenue & Slover Avenue, Bloomington		
	PROJECT NO.	21005-F	PLATE	B-2-1

SOILS SOUTHWEST INC.
Consulting Foundation Engineers

CONSOLIDATION TESTS

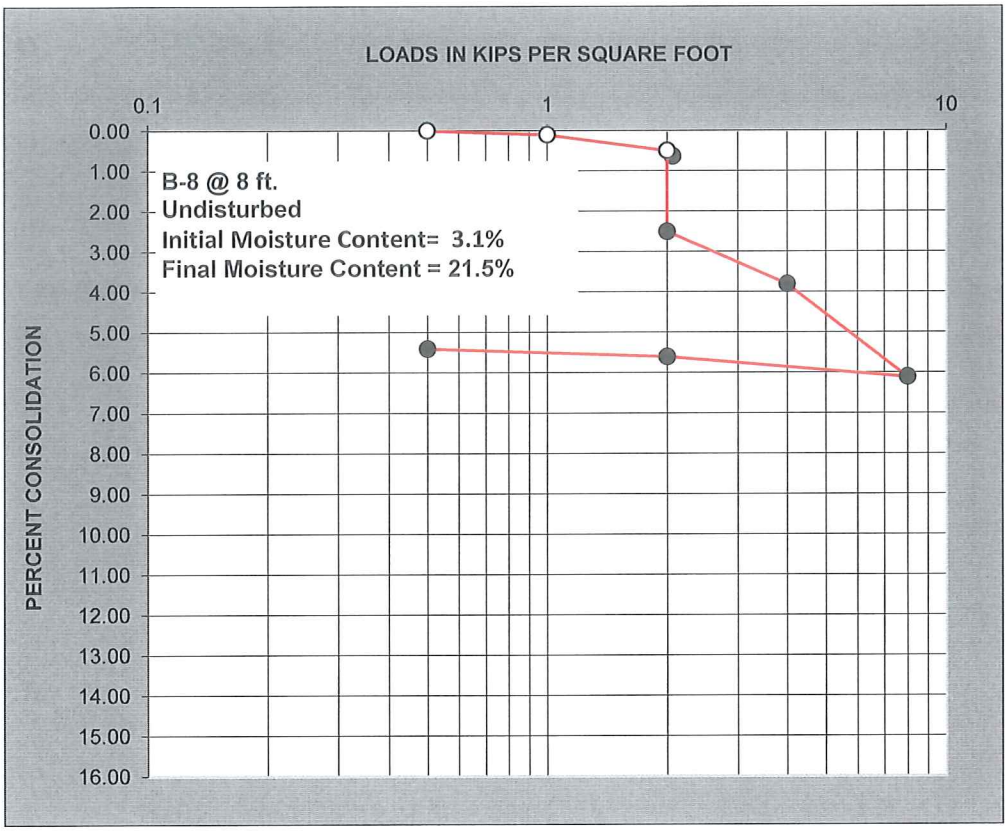


- **WATER PERMITTED TO CONTACT SAMPLE**

	PROJECT	Proposed Commercial Development SEC Cedar Avenue & Slover Avenue, Bloomington		
	PROJECT NO.	21005-F	PLATE	B-2-2

SOILS SOUTHWEST INC.
Consulting Foundation Engineers

CONSOLIDATION TESTS



- **WATER PERMITTED TO CONTACT SAMPLE**

	PROJECT	Proposed Commercial Development SEC Cedar Avenue & Slover Avenue, Bloomington		
	PROJECT NO.	21005-F	PLATE	B-2-3

SOILS SOUTHWEST INC.
Consulting Foundation Engineers

Expansion Index

ASTM D 4829

Machine No: 2 **Project Name:** Scott Beard_Commercial Development
Project No: 21005-F **Lot/Boring/Trench:** B-7@ 4-7
Depth (ft): 4 to 7 **Tract No:**
Location:Pala Rd. SEC Cedar Ave. &Slover **Technician:** John Flippin
Date: 3/12/2021 Bloomington

TEST DATA		Load: 144 lb	Ring = 1" x 4"
	Dial Reading	Time (h:m)	Date
Dry / 10 min	0	12:50	3/12/2021
Inundate	0	1:00	3/12/2021
Reading	2	2:00	3/12/2021
Reading	0	10:05	3/12/2021
EI (measured)	29	8:04	3/15/2021

DEGREE OF SATURATION DATA	Test A	Test B
A. Initial Moisture Content (%)	8.88%	0.00%
B. Weight of wet soil + Ring (g)	783.70	0.00
C. Weight of Ring (g)	365.70	188.70
D. Weight of Wet Soil (g) (B-C)	418.00	-188.70
E. Weight of Dry Soil (g) (D/(1 + A))	383.91	-188.70
F. Wet Density (pcf) D g/cubic cm/207 cubic cm convert to pcf (x 62.4) (1gram/cubic cm = 62.4 lbs cubic foot)	126.01	-56.88
G. Dry Density (pcf) E g/cubic cm/207 cubic cm convert to pcf (x 62.4)	115.73	-56.88
H. Weight of Water (pcf) (A x G)	10.28	0.00
I. Volume of Solids (cubic ft) (G/(2.7 sp. Gravity x 62.4))	0.69	-0.34
J. Volume of Voids (cubic ft) (1-I)	0.31	1.34
Degree of saturation (%) Volume of water/volume of void x 100 H/62.4/J (%)	52.60	0.00

Expansion Potential			
	Test A	Test B	
0 - 20	N/A	N/A	VERY LOW
21 - 50	N/A	N/A	LOW
51 - 90	N/A	N/A	MEDIUM
91 - 130	N/A	N/A	HIGH
>130	N/A	N/A	VERY HIGH

FINAL RESULTS		
Expansion Index (EI60) (A)	0.00	Final Moisture Content (%) 13.42
Expansion Index (EI60) (B)	0.00	← Note: Disregard Test (B) if Degree of Saturation is 0.0

CORRECTION FOR DEGREE OF SATURATION

EI60 = EI measured - (50-S measured) x ((65 + EI measured) / (220 - S measured))

Soils Southwest, Inc

SAND EQUIVALENT TEST

Test Date: March 11, 2021

Project No.: 21005-F

Job Name: Scott Beard/Commercial Development
SEC Cedar Avenue & Slover Avenue, Bloomington

Sample Location: B-2@0-5'

Sample by: JF Tested by: RM

LABORATORY DATA

SAMPLE NO.	1	2	3	4
TIME START	3:43	3:48	3:53	
TIME SOAK (10 min.)	3:53	3:58	4:03	
TIME AT LEVEL 15ML	3:55	4:00	4:05	
TIME of READING (20-min)	4:15	4:20	4:25	
FINE, ML	5.9	6.0	5.9	
COARSE, ML	0.9	0.7	0.9	
SE = 100x (coarse/fine)	15.25	11.66	15.25	
SE Average	14.05			

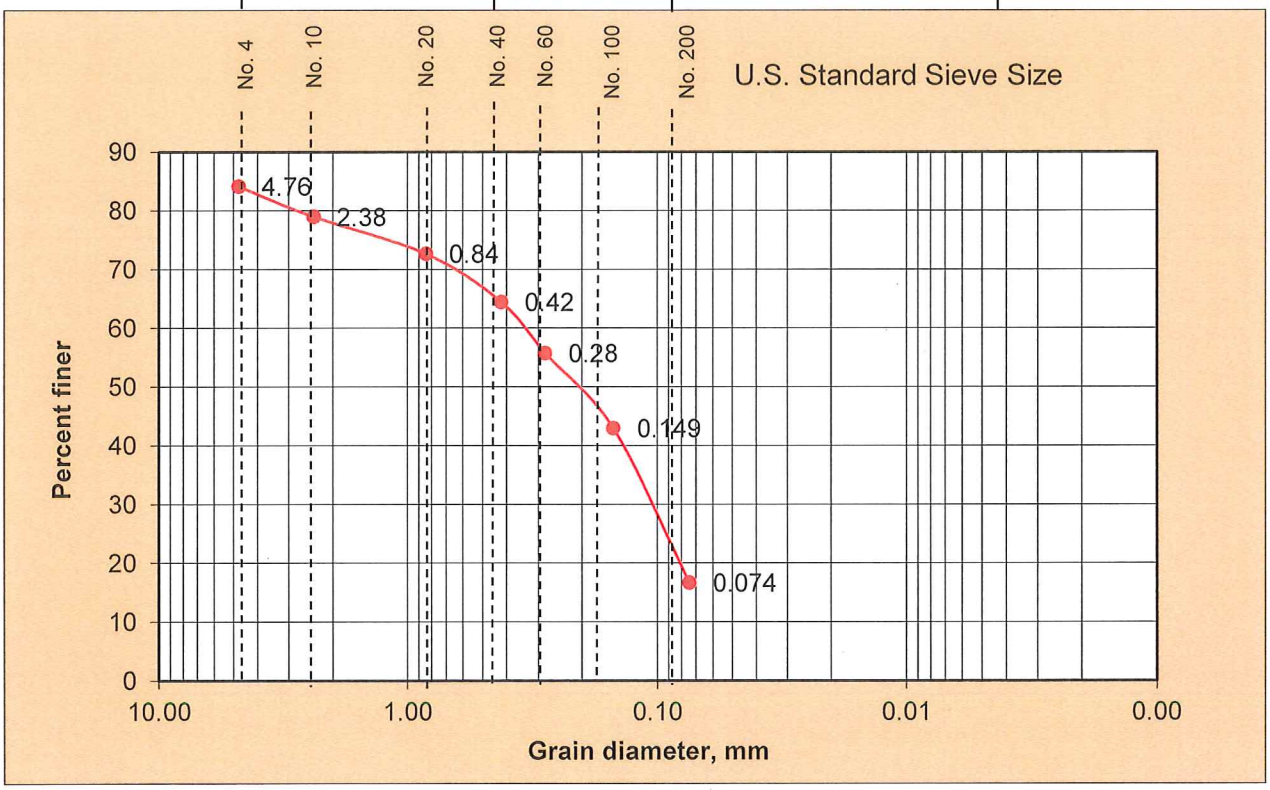
Soil Description: GM: Gravely and silty sand mixtures, fine to coarse with rock fragments, rocks, and scattered cobbles.

GRAIN SIZE DISTRIBUTION

Project: Scott Beard **Job #** 21005-f
Location: ↄ Cedar Avenue & Slover Ave BLMT **Boring No:** B-2@0-5 **Sample No:** #1
Description of Soil: GM fine to coarse coare silty sands
Date of Sample: 3/2/2021
Tested By: RM **Date of Testing:** 3/10/2021

Sieve No.	Sieve Openings in mm	Percent Finer	Grain Size	% Retained
4	4.76	84.20	Gravel	16
10	2.38	79.00	Med. to Crs	19
20	0.84	72.70	Fines	42
40	0.42	64.50	Silts	23
60	0.28	55.80		
100	0.149	43.00		
200	0.074	16.70		

Gravel	Sand			
	Coarse to Medium	Fine	Silt	Clay



Visual Soil Description : SAND- lt. brn, silty, gravely, fine to coarse sands with rock fragments rock and scattered cobbles

Soil Classification: GM

System: USC

SOILS SOUTHWEST INC.
Consulting Foundation Engineers

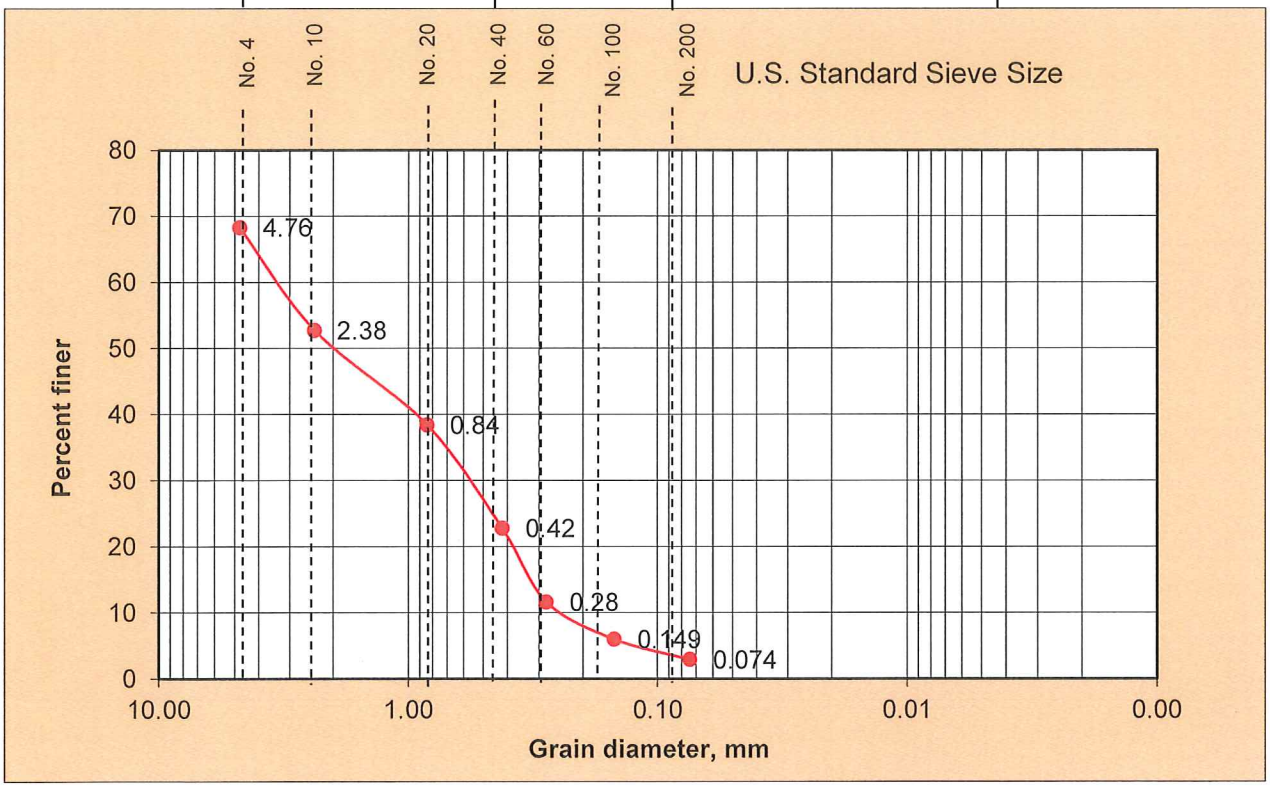
GRAIN SIZE DISTRIBUTION

Project: Scott Beard **Job #** 21005-BMP
Location: Cedar Ave and Slover Ave, Bloomir **Boring No:** P-5 at 12' **Sample No:** 1
Description of Soil: Gravelly Sand, fine to course, rocks, and slight traces of silt.
Date of Sample: 3/2/2021
Tested By: Alex **Date of Testing:** 3/15/2021

Sieve No.	Sieve Openings in mm	Percent Finer
4	4.76	68.36
10	2.38	52.78
20	0.84	38.46
40	0.42	22.84
60	0.28	11.66
100	0.149	6.04
200	0.074	2.98

Grain Size	% Retained
Gravel	32
Med. to Crs	44
Fines	20
Silts	4
Clays	0

Gravel	Sand			
	Coarse to Medium	Fine	Silt	Clay



Visual Soil Description : Sand - fine to course, rocks, and traces of silt.

Soil Classification: GP-SP

System: USC

SOILS SOUTHWEST INC.
Consulting Foundation Engineers

APPENDIX C

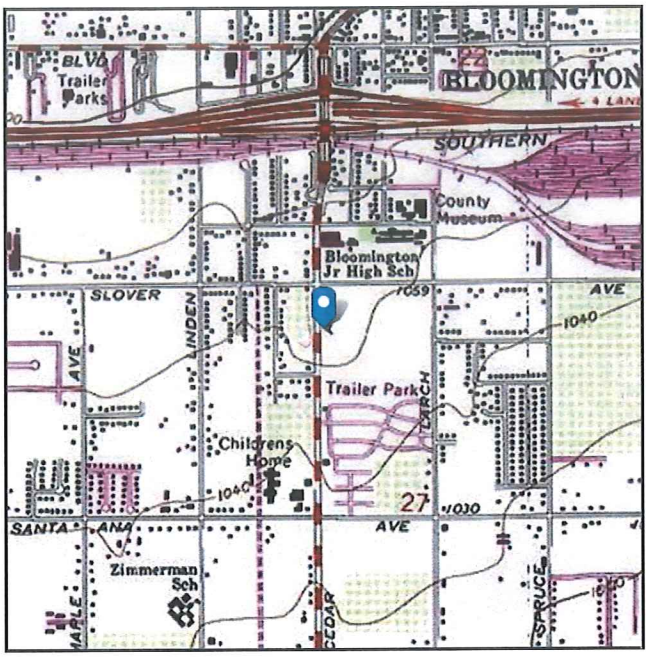
Supplemental Seismic Design Parameters (CBC 2019)

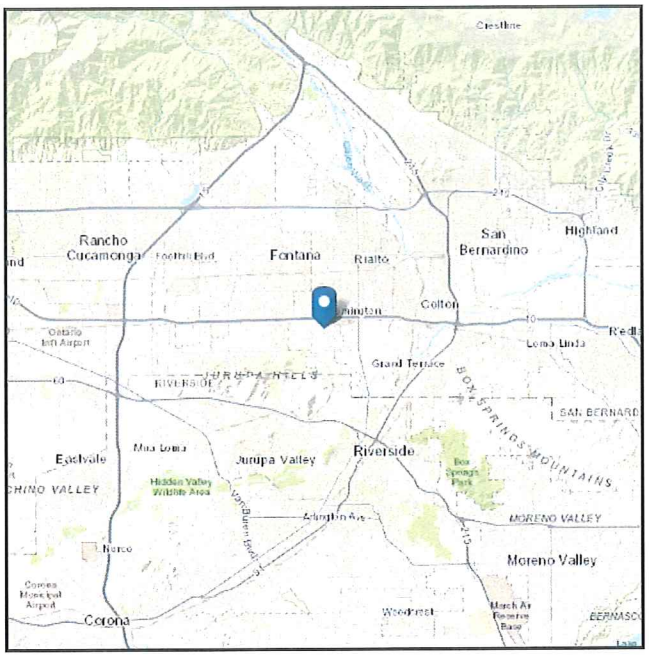
ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: III
Soil Class: D - Stiff Soil

Elevation: 1065.99 ft (NAVD 88)
Latitude: 34.061633
Longitude: -117.396006





ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Seismic

Site Soil Class: D - Stiff Soil

Results:

S_S :	1.58	S_{D1} :	N/A
S_1 :	0.614	T_L :	12
F_a :	1	PGA :	0.67
F_v :	N/A	PGA_M :	0.737
S_{MS} :	1.58	F_{PGA} :	1.1
S_{M1} :	N/A	I_e :	1.25
S_{DS} :	1.053	C_v :	1.416

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

Data Accessed: Mon Feb 22 2021

Date Source: USGS Seismic Design Maps

Ground Motion Interpolator

Ground Motion Interpolator (2008)

Longitude: -117.396006

Latitude: 34.061633

Site Condition (VS30): 270 (180-1050 m/sec)

Return Period:

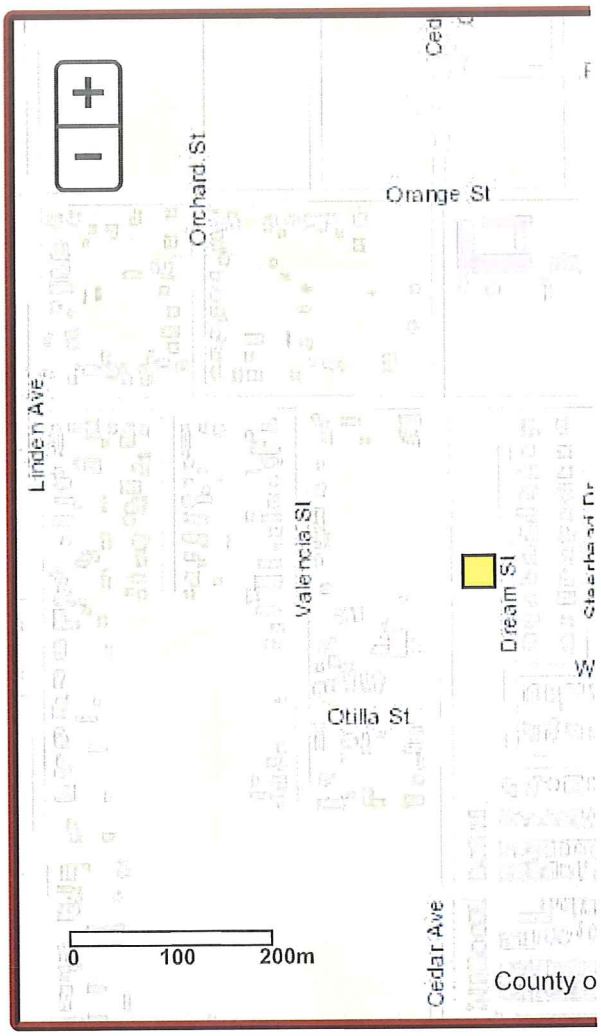
2% in 50 years 10% in 50 years

Spectral Acceleration:

PGA 0.2 second SA 1.0 second SA

Submit

Inputs:	**Result:**
-117.396006, 34.061633 vs30: 270 m/sec 10% in 50 years PGA	**0.549 g**



Information and Disclaimer

U.S. Geological Survey - Earthquake Hazards Program

2008 National Seismic Hazard Maps - Source Parameters

New Search

Distance in Miles	Name	State	Pref Slip Rate (mm/yr)	Dip (degrees)	Dip Dir	Slip Sense	Rupture Top (km)	Rupture Bottom (km)	Length (km)
4.86	San Jacinto;SBV	CA	6	90	V	strike slip	0	16	45
4.86	San Jacinto;SBV+SJV+A	CA	n/a	90	V	strike slip	0	16	134
4.86	San Jacinto;SBV+SJV+A+C	CA	n/a	90	V	strike slip	0	17	181
4.86	San Jacinto;SBV+SJV+A+CC	CA	n/a	90	V	strike slip	0	16	181
4.86	San Jacinto;SBV+SJV+A+CC+B	CA	n/a	90	V	strike slip	0.1	15	215
4.86	San Jacinto;SBV+SJV+A+CC+B+SM	CA	n/a	90	V	strike slip	0.1	15	241
4.86	San Jacinto;SBV+SJV	CA	n/a	90	V	strike slip	0	16	88
8.42	Cucamonga	CA	5	45	N	thrust	0	8	28
9.58	San Jacinto;SJV	CA	18	90	V	strike slip	0	16	43
9.58	San Jacinto;SJV+A+C	CA	n/a	90	V	strike slip	0	17	136
9.58	San Jacinto;SJV+A+CC	CA	n/a	90	V	strike slip	0	16	136
9.58	San Jacinto;SJV+A+CC+B	CA	n/a	90	V	strike slip	0.1	15	170
9.58	San Jacinto;SJV+A+CC+B+SM	CA	n/a	90	V	strike slip	0.1	15	196
9.58	San Jacinto;SJV+A	CA	n/a	90	V	strike slip	0	17	89
10.21	S. San Andreas;NSB	CA	22	90	V	strike slip	0	13	35
10.21	S. San Andreas;NSB+SSB	CA	n/a	90	V	strike slip	0	13	79
10.21	S. San Andreas;NSB+SSB+BG	CA	n/a	75		strike slip	0	14	136
10.21	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB	CA	n/a	90	V	strike	0.1	13	377

U.S. Geological Survey - Earthquake Hazards Program

2008 National Seismic Hazard Maps - Source Parameters

New Search

Fault Name	State
San Jacinto;SBV	**California**

GEOMETRY	
Dip (degrees)	90
Dip direction	V
Sense of slip	strike slip
Rupture top (km)	0
Rupture bottom (km)	16
Rake (degrees)	180
Length (km)	45

MODEL VALUES		
Slip Rate	6	
Probability of activity	1	
	ELLSWORTH	HANKS
Minimum magnitude	6.5	6.5
Maximum magnitude	7.06	6.88
b-value	0.8	0.8

Fault Model	Deformation	Char Rate[1]	GR-a-	Weight

	Model		value[1]	
A priori	2.1	2.50e-03 / 2.50e-03	NA / NA	0.50
Moment Balanced	2.1	4.81e-04 / 4.81e-04	NA / NA	0.25
Moment Balanced	2.2	1.72e-03 / 2.50e-03	NA / NA	0.10
Moment Balanced	2.3	4.81e-04 / 4.81e-04	NA / NA	0.15

[1] 1st Value is based on Ellsworth relation and 2nd value is based on Hanks and Bakun relation

APPENDIX D

Soil Corrosivity Analyses
A&R Test Results

A & R Laboratories, Inc.

1650 S. GROVE AVE., SUITE C
ONTARIO, CA 91761
951-779-0310 FAX 951-779-0344
www.arlaboratories.com office@arlaboratories.com

FDA#	2030513
LA City#	10261
ELAP#'s	2789
	2790
	2122

CHEMISTRY · MICROBIOLOGY · FOOD SAFETY · MOBILE LABORATORIES
FOOD · COSMETICS · WATER · SOIL · SOIL VAPOR · WASTES

CASE NARRATIVE

Authorized Signature Name / Title (print)	Ken Zheng, President
Signature / Date	Ken Zheng Ken Zheng, President 03/09/2021 13:47:51
Laboratory Job No. (Certificate of Analysis No.)	2103-00073
Project Name / No.	RETAIL DEV. / SEC CEDAR AVE. & SLOVER AVE., BLOOMINGTON, CA 21005-F
Dates Sampled (from/to)	03/02/21 To 03/02/21
Dates Received (from/to)	03/05/21 To 03/05/21
Dates Reported (from/to)	03/09/21 To 3/9/2021
Chains of Custody Received	Yes

Comments:

Subcontracting

Inorganic Analyses

No analyses sub-contracted

Other Analyses

No analyses sub-contracted

Sample Condition(s)

All samples intact

Positive Results (Organic Compounds)

None

A & R Laboratories, Inc.

1650 S. GROVE AVE., SUITE C
ONTARIO, CA 91761
951-779-0310 FAX 951-779-0344
www.arlaboratories.com office@arlaboratories.com

FDA#	2030513
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	2790
	2122

CHEMISTRY · MICROBIOLOGY · FOOD SAFETY · MOBILE LABORATORIES
FOOD · COSMETICS · WATER · SOIL · SOIL VAPOR · WASTES

CERTIFICATE OF ANALYSIS

2103-00073

SOILS SOUTHWEST INC
MOLOY GUPTA
897 VIA LATA SUITE N
COLTON, CA 92324

Date Reported	03/09/21
Date Received	03/05/21
Invoice No.	91171
Cust #	S192
Permit Number	
Customer P.O.	21005-F

Project: RETAIL DEV. / SEC CEDAR AVE. & SLOVER AVE., BLOOM

Analysis	Result	Qual	Units	Method	DF	RL	Date	Tech
Sample: 001 B-3@3-5'					Date & Time Sampled:		03/02/21 @ 8:30	
Sample Matrix: Soil								
pH	**7.10**		units	EPA 9045C	1.0	0	03/05/21	DV
Resistivity	**490**		ohms/cm	SM 2510B	1.0	1.0	03/09/21	DV
Chloride	**16**		mg/Kg	EPA 300.0	1.0	5.0	03/05/21	TLB
Sulfate	**100**		mg/Kg	EPA 300.0	1.0	5.0	03/05/21	TLB

Respectfully Submitted: Ken Zheng

Ken Zheng - Lab Director

QUALIFIERS

B = Detected in the associated Method Blank at a concentration above the routine RL.
B1 = BOD dilution water is over specifications . The reported result may be biased high.
D = Surrogate recoveries are not calculated due to sample dilution.
E = Estimated value; Value exceeds calibration level of instrument.
H = Analyte was prepared and/or analyzed outside of the analytical method holding time
I = Matrix Interference.
J = Analyte concentration detected between RL and MDL.
Q = One or more quality control criteria did not meet specifications. See Comments for further explanation.
S = Customer provided specification limit exceeded.

ABBREVIATIONS

DF = Dilution Factor
RL = Reporting Limit, Adjusted by DF
MDL = Method Detection Limit, Adjusted by DF
Qual = Qualifier
Tech = Technician

As regulatory limits change frequently, A & R Laboratories advises the recipient of this report to confirm such limits with the appropriate federal, state, or local authorities before acting in reliance on the regulatory limits provided.

For any feedback concerning our services, please contact Jenny Jiang, Project Manager at 951.779.0310. You may also contact Ken Zheng, President at office@arlaboratories.com.

ARL

A & R Laboratories
1650 S. Grove Ave., Ste C, Ontario, CA 91761
Tel: 951-779-0310 / 909-781-6335 Fax: 951-779-0344
E-mail: office@arlaboratories.com

CHAIN OF CUSTODY

A & R Work Order #: 2103-73

Page 1 of 1

Client Name	Soils Southwest, Inc.
E-mail	soilssouthwest@aol.com
Address	497 Via Lata suite N, Colton CA 92324
Report Attention	Moloy G.
Phone # / Fax: #	909-370-0474
Sampled By	John
Project No./ Name	Retail Development 21005-F
Project Site	SEC Cedar Ave & Slover Ave. Bloomington, CA

☒ Chilled ☒ Intact ☐ Seal

Turn Around Time Requested: ☐ Rush 8 12 24 48 Hours ☒ Normal

Lab # (Lab use)	Client Sample ID	Sample Collection Date	Sample Collection Time	Matrix Type	Sample Preserve	No., type* & size of container	EPA8260B (VOCs & Oxygenates)	EPA8260B(BTEX & Oxygenates)	LUFT / 8015 (Gasoline)	LUFT / 8015 (Diesel)	EPA8081A (Organochlorine Pesticides)	EPA 8082 (PCBs)	EPA 8015M (Carbon Chain C4-C40)	EPA 6010B/7000 (CAM 17 Metals)	Micro: Plate Cnt., Coliform, E-Coli	Resistivity	Sulfate	pH	Chloride			Remarks
1	B-3 @ 3-5'	3/2/21	8:30 AM	Soil	Jar	4 ounce										✓	✓	✓	✓			

Relinquished By	Company	Date	Time	Received By	Company	Date	Time
		3/5/21	9:34		A&R	3-5-21	9:34
Relinquished By	Company	Date	Time	Received By	Company	Date	Time

Note: Samples are discarded 30 days after results are reported unless other arrangements are made.

Matrix Code: DW=Drinking Water; GW=Ground Water; WW=Waste Water; SD=Solid Waste; SL=Sludge; SS=Soil/Sediment; AR=Air; PP=Pure Product

Preservative Code: IC=Ice; HC=HCl; HN=HNO_3; SH=NaOH; ST=$Na_2S_2O_3$; HS=H_2SO_4

* Sample Container Types: T=Tedlar Air Bag; G=Glass Container; ST= Steel Tube; B= Brass Tube; P=Plastic Bottle; V=VOA Vial; E= EnCore

Sample Acceptance Checklist

CLIENT: Soils SW WORK ORDER NUMBER: 2103-00073

Temperature:(Criteria:0.0°C-6.0°C)

Sample Temp.(w/CF) °C(w/CF) 4.0°C

☐ Sample(s) outside temprature criteria: PM contacted by :

☐ Sample(s) outside temprature criteria, but received on ice/chilled on same day of sampling.

☐ Sample(s) received at ambient temprature; placed on ice for transport by courier.

☐ Ambient Temprature ☐ Air ☐ Filter

CUSTODY SEAL:

Cooler	☐	Present and Intact	☐	Present and Not Intact	✓	Not Present
Sample(s)	☐	Present and Intact	☐	Present and Not Intact	✓	Not Present

Sample Condition:	Yes	No	N/A
Was a COC received	✓		
Were sample IDs present?	✓		
Were sampling dates & times present?	✓		
Was a relingquished signature present?	✓		
Were the tests required clearly indicated?	✓		
Were all samples sealed in plastic bags?		✓	
Did all bottle labels agree with COC? (ID, dates and times)	✓		
Were correct containers used for the tests required?	✓		
Was a sufficient amount of samples sent for tests indicated?	✓		
Was there headspace in VOA vials?			✓
Were the containers labeled with correct preservatives?			✓

Explanations/Comments:

Notification:

For discrepancies, how was the Project Manager notified? Verbal

Verbal: PM Initials: _____ Data/Time: _____

Email: Send to: _____ Data/Time: _____

Project Manager's response:

Completed By: _____ Date: 3-5-21

A R Laboratories
1650 S. Grove Ave., Suite C, Ontario, CA 91761
PH: 951-779-0310 Fax: 951-779-0344
Email: office@arlaboratories.com

APPENDIX E

R-Value Analytical Report
Anaheim Test Lab, Inc.

ANAHEIM TEST LAB, INC

196 Technology Drive, Unit D
Irvine, CA 92618
Phone (949) 336-6544

TO:

SOILS SOUTHWEST, INC.
897 VIA LATA # N
COLTON, CA. 92324

DATE: 3/8/2021

P.O. NO: VERBAL

LAB NO: C-4589

SPECIFICATION: CA 301

MATERIAL: Brown, F. Silty Sand

Project No.: 21005-F
Scott Beard
SEC Cedar Ave & Slover Ave, Bloomington
Sample ID: B-2 @ 0-5'

ANALYTICAL REPORT
"R" VALUE

BY EXUDATION	BY EXPANSION
72	N/A

RESPECTFULLY SUBMITTED

WES BRIDGER LAB MANAGER

"R" VALUE CA 301

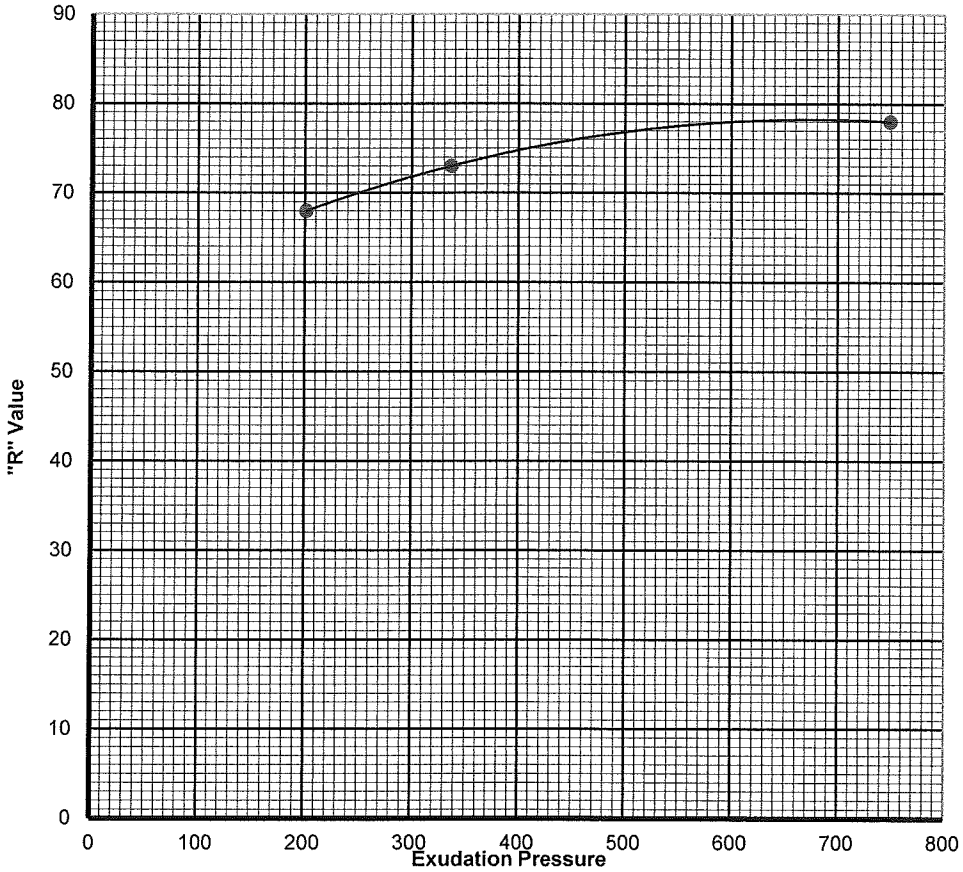
Client: Soils Southwest, Inc. **ATL No.:** C 4589 **Date:** 3/8/2021

Client Reference No.: 21005-F

Sample: B-2 @ 0 - 5' **Soil Type:** Brown, F. Silty Sand

TEST SPECIMEN		A	B	C	D
Compactor Air Pressure	psi	350	350	350	
Initial Moisture Content	%	5.9	5.9	5.9	
Moisture at Compaction	%	9.4	8.7	9.8	
Briquette Height	in.	2.48	2.45	2.48	
Dry Density	pcf	124.5	124.8	123.1	
EXUDATION PRESSURE	psi	201	749	337	
EXPANSION dial	(x .0001)	0	8	0	
Ph at 1000 pounds	psi	22	17	19	
Ph at 2000 pounds	psi	35	25	30	
Displacement	turns	4.12	3.85	3.92	
"R" Value		68	78	73	
CORRECTED "R" VALUE		68	78	73	

Final "R" Value	
BY EXUDATION: @ 300 psi	**72**
BY EXPANSION: TI = 5.0	**N/A**



PROFESSIONAL LIMITATIONS

Our investigation was performed using the degree of care and skill ordinarily exercised, under similar circumstances by other reputable Soils Engineers practicing in these general or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

The investigations are based on soil samples only, consequently the recommendations provided shall be considered 'preliminary'. The samples taken and used for testing and the observations made are believed representative of site conditions; however, soil and geologic conditions can vary significantly between test excavations. If this occurs, the changed conditions must be evaluated by the Project Soils Engineer and designs adjusted as required or alternate design recommended.

The report is issued with the understanding that it is the responsibility of the owner, or of his representative, to ensure that the information and recommendations contained herein are brought to the attention of the project architect and engineers. Appropriate recommendations should be incorporated into structural plans. The necessary steps should be taken to see that out such recommendations in field.

The findings of this report are valid as of this present date. However, changes in the conditions of a property can occur with the passage of time, whether they due to natural process or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur from legislation or broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by change outside of our control. Therefore, this report is subject to review and should be updated after a period of one year.

RECOMMENDED SERVICES

The review of grading plans and specifications, field observations and testing by a geotechnical representative of this office is integral part of the conclusions and recommendations made in this report. If Soils Southwest, Inc. (SSW) is not retained for these services, the Client agrees to assume SSI's responsibility for any potential claims that may arise during and after construction, or during the life-time use of the structure and its appurtenant.

The recommendations supplied should be considered valid and applicable, provided the following conditions, in minimum, are met:

i. Pre-grade meeting with contractor, public agency and soils engineer,
ii. Excavated bottom inspections and verification s by soils engineer prior to backfill placement,
iii. Continuous observations and testing during site preparation and structural fill soils placement,
iv. Observation and inspection of footing trenching prior to steel and concrete placement,
v. Subgrade verifications including plumbing trench backfills prior to concrete slab-on-grade placement,
vi On and off-site utility trench backfill testing and verifications,
vii Precise-grading plan review, and
viii. Consultations as required during construction, or upon your request.

Soils Southwest, Inc. will assume no responsibility for any structural distresses during its life-time use; in event the above conditions are not strictly fulfilled.